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ABSTRACT

This guide is the result of a 2-year initiative, Results-Based Staff Development for the Middle Grades. It provides information and resources for selecting, designing, and evaluating staff development to improve student achievement. It targets school staff development committees, principals, staff development leaders, and curriculum coordinators. The guide describes 26 successful staff development programs in language arts, mathematics, science, social studies, and interdisciplinary programs. It offers guidelines for selecting and/or designing initiatives to improve student performance. There are seven chapters in three parts. Part 1, "Increasing Student Achievement through Teacher Learning," offers (1) "Filling the Crack in the Middle: A Research Summary" and (2) "The Link Between Staff Development and Student Achievement." Part 2, "Staff Development Program Descriptions," includes (3) "Selection Process" and (4) "Reading the Program Descriptions." Part 3, "Achieving Results," offers (5) "Common Characteristics of Programs in this Guide," (6) "How to Use This Guide," and (7) "Next Steps." (Contains 65 references.) (SM)

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What Works in the Middle: Results-Based Staff Development

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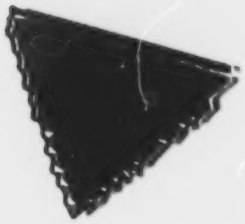

What Works in the Middle: Results-Based Staff Development

Joellen Killion, Project Director

Produced by the initiative
Results-Based Staff Development for the Middle Grades

Funded by the Edna McConnell Clark Foundation

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To ensure success for all students by serving as the international network for those who improve schools and by advancing individual and organization development.

NSDC BELIEFS

We believe that:

- Change creates opportunities for growth;
- The primary purpose of staff development is school improvement as measured by success of every student;
- Staff development is fundamental to school improvement;
- All educators share the responsibility for both individual growth and organizational growth;
- Trust is vital for individual and organization development;
- Individuals and organizations are responsible for defining and achieving standards of excellence;
- Effective staff development is based on theory, research, and proven practice;
- Diversity strengthens;
- Expectations influence accomplishment;
- Example is a powerful teacher;
- Collaboration within the school, community, students, families, community members, and staff is essential for school improvement and accelerated student success;
- Effective staff development honors differences in learners by using various approaches to learning;
- Staff development is responsible for organization development and individual development; and
- Staff development is critical for all those who affect student learning.

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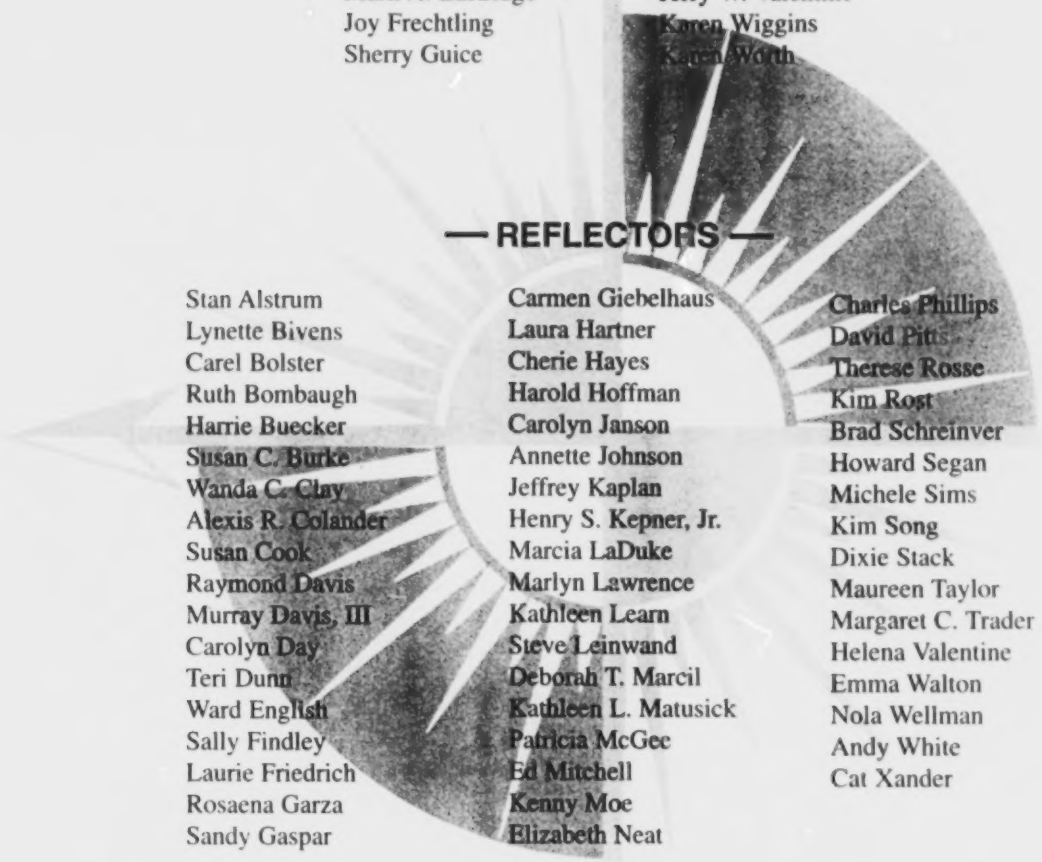

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Stephanie Hirsh, Associate Executive Director, National Staff Development Council, originator of the idea and proposal writer, guided the entire initiative with creativity, leadership, and commitment to NSDC's mission.

Dennis Sparks, Executive Director, National Staff Development Council, with an unrivaled passion for linking staff development and student achievement, provided insightful guidance for the initiative at all stages of its work.

National Staff Development Council's Board of Trustees, to achieve their mission, made it a priority for this project to link staff development and student achievement. Their support of the initiative has been firm.

National Advisory Panel, a dedicated group of 18 experts from the partner professional associations and education agencies, literally did the work. They spent countless hours providing leadership for the initiative, clarifying criteria, reviewing programs, and advising the project director.

Partner professional associations contributed to the success of this initiative.

- National Association of Secondary School Principals
- National Middle School Association

Professional associations supported this effort by providing representatives to act as content experts, critical friends, professional development experts, key informants, and collaborators. While the results of this initiative are not sanctioned or endorsed by these associations, their support and input were invaluable during the study.

ERIC Clearinghouse
National Council for the Social Studies
National Council of Teachers of English
National Council of Teachers of Mathematics
National Science Teachers Association
North Central Regional Educational Laboratory

Expert Review Council, 26 middle-grade experts, offered feedback, input, and suggestions to the project director and the National Advisory Panel throughout the process.

Reflector Groups, school and district curriculum coordinators, staff development directors, and program directors, reviewed drafts and offered advice to make the guide readable and useful to the intended audiences.

Hundreds of staff development program designers and providers shared information about their programs.

Adams Twelve, Five Star Schools in Northglenn, Colorado, loaned the project director, Joellen Killion, to NSDC for her two years' work on the initiative.

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Nancy Ottem, Omar Rodriguez, and **Catherine Newton** lent their creative, artistic, and analytic talents to shape the design and text of this book. Their support was invaluable.

Many resource guides and databases provided sources of possible programs to investigate. The National Diffusion Network's *Educational Programs That Work*, ERIC Clearinghouse, the Eisenhower Clearinghouse for Math and Science, TERC, Academy for Educational Development, Educational Development Center, National Science Foundation, Project 2061, and others supported this effort with information and ideas.

Countless people offered ideas and leads for this project. Much of the success of the initiative came as a result of interested people who suggested others as sources of information.

Teacher Learning Increases Student Learning

In today's reform environment, schools are slowly beginning to shift from what teachers should teach to what students should learn. Academic standards emphasize what students "should know and be able to do" rather than the scope and sequence of curricula. This does not mean that teachers' roles have diminished; indeed, they are more important than ever. Students cannot learn the knowledge and skills they need to perform at standard if teachers do not have the knowledge and skills to teach them. Unfortunately, many teachers do not.

Content standards may call for students to develop knowledge and skills that teachers have not previously addressed. Many teachers are teaching outside of the subject area of their pre-service preparation. And many have earned only the minimal credits necessary to qualify for their degree and license to teach. In other words, the new emphasis on standards and helping students meet them is just as challenging for teachers as for students. Many teachers are being jarred awake by their students' inadequate performance on standards-based assessments.

To enable students to achieve current academic standards requires an increasing range of content knowledge and instructional skills. It is not enough for teachers to prepare well, use class time efficiently, master classroom management, or be responsive to students' learning styles. Teachers must also be secure in the content they teach, understand how to convert their knowledge of content into standards-based instruction, and have the pedagogical skills to lead students toward knowing and developing quality work. For this, many teachers will need intensive staff development. There simply is no substitute for teachers' participation in sustained and deep learning experiences they can draw upon to help students perform at standard.

But what learning experiences are worthwhile? Myriads of programs masquerade as "staff development" with little evidence that they are powerful enough to increase student achievement. Actually, the process and substance of what most teachers experience as "staff development" are counter-productive. They abuse teachers' time. They insult their intelligence. Even worse, they foster resistance to professional development design and content that would allow them to become more effective educators who know how to impact student achievement.

Fortunately, this does not characterize all staff development. As this guide demonstrates, some content-specific staff development programs show promise of increasing the learning of both teachers and students. The guide is a pioneering work because for

the first time knowledgeable content specialists have collaborated to systematically identify and select staff development programs that are sound in process, content, and results. While this publication will be a useful resource to staff development leaders, it is not perfect and will inevitably spark discussion about why some staff development programs are included and others are not. This dialogue is welcome and necessary to focus greater attention on results and appropriate measures of effectiveness for staff development.

Like any guide, however, this publication will only make a difference if persons responsible for conceiving and planning staff development use it. High-quality staff development is never convenient, quick, or easy. There are no shortcuts. Many of the programs described here require careful planning and implementation — and hard work by participants.

But, there is a profound link between how hard teachers work and how hard students work, just as there is between what teachers know and can do and what students know and can do. For staff development leaders who are serious about increasing the knowledge and skills of today's teachers, with the expectation that doing so will also raise the levels of student performance, this guide is an invaluable tool.

M. Hayes Mizell
Director
Programs for Student Achievement
Edna McConnell Clark Foundation
New York, New York

FOREWORD

Creating a Context for Sustained Learning

What Works in the Middle: Results-Based Staff Development tells us that well-designed staff development makes a difference in student learning. As this guide makes clear, successful staff development deepens teachers' understanding of the content they teach and expands their repertoire of instructional skills. The National Staff Development Council hopes that readers of this guide will use it to plan and implement staff development that assists all middle-grade students and teachers to learn and perform at high levels. To be successful, however, such staff development efforts must be surrounded by an organizational context that supports and sustains teacher learning.

An essential element of such a context is skillful leadership on the part of principals and district administrators. These leaders must help create community-wide consensus regarding a compelling vision that embodies high expectations for student learning, teaching, and staff development. In addition, they must be "keepers of the dream" who frequently remind everyone of the school's values and core beliefs.

Schools must also provide a supportive culture that sustains learning and high performance. Through stories, symbols, and heroes, each school's organizational culture expresses the highest aspirations of the school for the learning of all its students. Schools that intend to achieve their aspirations will nurture collaboration, experimentation, and continuous improvement. They will also respect the school's culture and incorporate it into the professional development process.

Structural elements such as school schedules and calendars, union contracts, teacher evaluation methods, incentives for learning, and belief systems also affect learning and performance. Results-driven staff development requires that teachers have time each day for team-based learning and collaboration with colleagues. And, results-based staff development should incorporate incentive systems that reward both demonstrated teacher knowledge and skill and improvements in student learning, rather than accrual of teacher "seat-time" as expressed in continuing education units or course credits. Staff development efforts that focus on results are driven by two core beliefs: the capacity of virtually all students to learn at high levels and the school's responsibility for ensuring that learning.

What Works in the Middle: Results-Based Staff Development shows us that well-designed staff development with appropriate content and powerful processes for adult learning can lead to improvements in student learning. Now it is up to the

school leaders who study this guide to make certain that its essential findings are implemented within organizations that sustain teacher and student learning. Nothing less will do if our goal is to prepare students for a successful life in an increasingly complex world.

Dennis Sparks
Executive Director
National Staff Development Council
Ann Arbor, Michigan

Part One

Increasing
Student Achievement
Through
Teacher Learning

Introduction

Middle grades shape the academic and personal futures of young adolescents. As one middle school principal puts it, "Merit scholars and prisoners are made in the middle." Producing merit scholars requires middle-grade teachers to have deep knowledge of their content area, use appropriate, content-specific instructional strategies, and understand the developmental needs of young adolescents.

The National Staff Development Council (NSDC), a professional association of approximately 8,000 educators, is committed to ensuring success for all students and aims to address the special needs of adolescents in the middle grades. Therefore, NSDC undertook the initiative Results-Based Staff Development for the Middle Grades. This guide is a result of the initiative and is offered to school staff development committees, principals, staff development leaders, curriculum coordinators, and others who wish to develop content-specific, middle-level staff development programs to improve student achievement at their own middle-grade schools.

The guide has several purposes. First, the guide provides information and resources for selecting, designing, and evaluating staff development to improve student achievement. The guide contains:

1. Descriptions of staff development programs in language arts, mathematics, science, social studies, and interdisciplinary programs that have successfully demonstrated a contribution to increased student achievement at the middle grades;

2. Guidelines for selecting and/or designing initiatives to improve student performance;

3. Strategies for evaluating staff development; and

4. Information about how the programs selected for inclusion in this guide meet or align with content-area standards and also with the National Staff Development Council's *Standards for Staff Development.*

Second, the guide serves as a "conversation piece," a name the National Advisory Panel affectionately gave this effort near its conclusion. Since it is a conversation piece, the National Advisory Panel hopes that practitioners and scholars will use it as a starting point for dialogue, continued study, and research to answer some fundamental questions:

- How does staff development impact student achievement?
- What type of staff development is necessary to extend teachers' content knowledge and content-specific instructional practices?
- How can schools and districts demonstrate that staff development contributes to student achievement?
- What types of research designs and evidence of student achievement support a claim that staff development leads to increased student achievement?

Third, this guide will help decision-makers become savvy consumers of staff development by providing:

- Lists of successful staff development programs that have evidence of increasing student achievement in the four core content areas;
- Summaries of the characteristics of effective staff development evident across these programs;
- Cross-referencing of these staff development efforts to national content standards in the core content areas and to the National Staff Development Council's *Standards for Staff Development*;
- Guidelines for selecting effective staff development programs; and
- Suggestions for effective ways to demonstrate the impact of staff development.

NSDC's Mission: Ensuring Success for All Students

One of NSDC's strategic priorities is demonstrating the link between teacher learning and student achievement. This guide, and the initiative that supported it, are about demonstrating that link in the middle grades. The early adolescent years shape lifelong habits of 10- to 14-year-old youths. Improving achievement in the middle grades remains both an urgent need and an enormous challenge. Targeting the improvement of teacher learning at the middle level through content-specific staff development holds promise as an effective intervention.

Results-Based Staff Development for the Middle Grades is one way NSDC is taking action to achieve its mission: ensuring success for all students through individual and organization development. According to Dennis Sparks, executive director of NSDC, "The time has come for NSDC to underscore its commitment to high levels of learning for *all* students and staff members." (Sparks, p. 2).

According to Sparks (1997), NSDC strives for the following results:

- Every school provides high levels of learning for all students, particularly in core academic areas.
- Every student has competent teachers.
- Each teacher has the preparation, professional development, and ongoing support that facilitates teaching competence.
- And, new and better forms of professional learning are both available and appropriately implemented.

NSDC took a leadership role in demonstrating the link between teacher learning and student achievement when it launched this initiative. Past staff development and school improvement efforts have too often failed to produce results for students. If teachers are to improve instruction and increase results for students, they must have deep knowledge of their content area and skills in teaching content. They also must understand child development and how learning occurs. And, they must have a positive attitude toward teaching in the middle grades. By extending teachers' content knowledge and content-specific pedagogical strategies, this project crosses the threshold of the classroom door — the place where learning occurs.

Results-Based Staff Development for the Middle Grades aimed to identify staff development efforts that enable middle-grade students and teachers to achieve high levels of learning. In this initiative, NSDC focused on the core subject areas of language arts, mathematics, science, and social studies. For each core subject area, NSDC identified middle-grade, content-based staff development programs that advanced teachers' content knowledge and pedagogical skills and resulted in increased student achievement.

Support from the Edna McConnell Clark Foundation

Results-Based Staff Development for the Middle Grades, the NSDC initiative that is the foundation for this guide, is one of a number of initiatives that the Edna McConnell Clark Foundation has supported to improve the middle school years, especially for urban youth.

The Clark Foundation is committed to improving the educational and life futures of 10- to 14-year-old students. Because Results-Based Staff Development for the Middle Grades focused on middle-grade youth, Clark, through its Programs for Student Achievement, agreed to fund the two-year study. Hayes Mizell, director of the foundation's Programs for Student Achievement, highlighted the reasons for Clark's work in middle schools:

> First, we believe that low-achieving middle school students can learn at high levels. Second, we believe that for middle schools to significantly enhance the performance of all students, schools must reform themselves. Third, we believe that the cultures of most middle schools must change dramatically so the normative values are high expectations, high content, and high support for all students. Fourth, whole-school reform is necessary; tinkering at the margins will not produce nor sustain the changes needed to increase student achievement. Fifth, school systems must have a vision for middle school reform and lead, support, monitor, and access reform at the building level. Sixth, teachers and administrators in individual middle schools must provide the leadership to plan and implement reform that is consistent with their school system's vision. (1992)

Mizell outlined his hopes for the project in his remarks to the National Advisory Panel at its July 1997 meeting.

> There are two major factors that will have to be manifest for middle school teachers to become more effective. The first is will: the will of school systems, schools, and educators to change. If and when school systems, schools, and educators decide — for whatever reason — to make changes that can improve student performance, the second factor comes into play. People must know what to do, how to change, to obtain different results. This is what Results-Based Staff Development for the Middle Grades is about.
>
> This project is built on the foundational belief that if student performance is going to increase, teacher performance must increase. If students are going to learn at higher levels, teachers must learn at higher levels. The central question of this project is: Assuming the will is there, what are the most effective content-specific staff development programs that result in increased student learning?
>
> It is my hope that this project can help middle school educators focus on what constitutes quality staff development and specific staff development programs that educators with the will to do so can use to improve student performance.

Role of the National Advisory Panel

The NSDC worked with representatives from the National Association of Secondary School Principals, the National Council for the Social Studies, National Council of Teachers of English, National Council of Teachers of Mathematics, National Middle School Association, National Science Teachers Association, ERIC Clearinghouses, and U.S. Department of Education's regional educational laboratories in this effort. A National Advisory Panel comprising representatives of these partner associations, plus a middle school principal, an evaluator, and an urban educator, guided the project.

Stephanie Hirsh, associate executive director of the National Staff Development Council and principal developer of the project proposal, described goals, results, and key features of the project to members of the National Advisory Panel at their first meeting in July 1997 at the headquarters of the National Association of Secondary School Principals in Reston, Virginia.

The project goals were to:

- Identify and analyze middle-level staff development initiatives that purport to improve teacher effectiveness and student learning and to disseminate information regarding initiatives that prove to be effective;

- Enable individuals, schools, school systems, regional service centers, and universities to identify and access staff development programs that will lead to the improvement of middle-grade teachers' content knowledge, instructional practices, and student learning in the areas of mathematics, language arts, science, and social studies;

- Provide a central resource/clearinghouse for staff development initiatives that meet stringent criteria and that demonstrate the link between staff development efforts and student learning.

Word of Caution

It is important that the reader understand what this guide *is* and *is not*.

- The guide is a compilation of 26 outstanding staff development programs in language arts, mathematics, science, and social studies. It is not a comprehensive list of all the staff development programs available for middle-grade teachers.

- The guide reports the results of 26 staff development programs. The programs included in the guide are not, however, endorsed by the National Staff Development Council or any of its partner associations.

- The guide is a catalog for ideas. It is not a catalog for shopping.

- The guide identifies common characteristics of the programs included. It is not, however, a meta-analysis of the programs.

- The guide is a description of what staff development is and has been. Because the programs vary in the number of NSDC standards they meet, the guide is not necessarily a picture of what staff development should be.

- The guide identifies programs currently used at specific middle schools as examples. It is not a list of exemplary middle schools.

The National Staff Development Council and the National Advisory Panel believe that the information in this resource guide will be useful to all its potential audiences. The guide should assist those who make decisions about staff development to become more aware of the critical nature of their decisions and the need to use the information contained here in a responsible manner. Suggestions for making those decisions are provided in Chapter 6, "How to Use This Guide."

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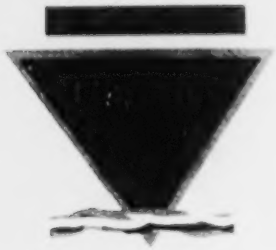

Filling the Crack in the Middle: A Research Summary

Middle grade students are at a crossroad—emotionally, physically, academically, and socially. Today's middle schools need caring, competent teachers who understand the unique needs of young adolescents and who establish a safe, nurturing learning environment. Further, teachers of the middle grades must expect all students to achieve a high level of learning and performance. This chapter draws on current research to explain why the middle grades are so important, discusses the link between student achievement and teacher learning, and describes the challenges of establishing this link.

Beginning in the Middle

Middle school is a crucial turning point in the education of a student. According to the Carnegie Corporation (1989), for many 10- to 15-year-old youths, early adolescence offers the opportunity to choose a path toward a productive and fulfilling life. For many others, it represents their last best chance to avoid a diminished future.

The challenges of educating early adolescents require caring, knowledgeable teachers who balance standards of academic excellence with the need for a nurturing environment. Middle-level students, those in grades five through eight, often fall through the cracks of the education system. Too often, educators and parents alike believe that middle-grade students cannot achieve rigorous academic standards while their bodies are growing and changing physically and while they are plagued by social and emotional problems associated with early adolescence. Yet, schools *can* make a difference for middle-grade students. These are schools that set high expectations, establish a coherent and systematic curriculum, use innovative instructional strategies in which teachers design learning experiences in a complex environment for heterogeneous groups, and engage students in peer-assisted learning (Joyce, 1995).

The middle grades are a significant transition time for students. Middle-grade students begin the inevitable journey of forming lifelong habits of mind which eventually contribute to their academic, social, emotional, and economic well-being as adults. Parents traditionally are less actively involved in the education of middle school students than they were as parents of elementary students. As students become more independent and have less supervision from parents and guardians, they rely less and less on those influences and more and more on the influences of their peers.

Nationally, middle-grade students tend to do less well academically than they did in elementary school. Inequities between high-achieving and low-achieving students deepen during the middle grades with detrimental consequences for those students who continue on the low-achieving track. To combat these problems, every middle-grade school should provide high standards, excellent teachers, challenging curriculum, and a safe and nurturing environment in which young adolescents can form positive, healthy attitudes.

The urgency of middle school reform is highlighted by the research on early adolescence. First, today's students present far greater challenges to classroom teachers than students of even a decade ago. A greater percentage of students who are at risk fill classrooms across the nation. Middle-grade teachers report that today's middle-grade students bring problems to school that previously were more typical of high school students. National survey results indicate that more middle-grade students are sexually active and have experimented with or are regular users of illegal substances (National Center for Educational Statistics, 1997). In addition, more middle-grade students have inadequate support or care from the traditional family, live in poverty, are victims of abuse, have been diagnosed with emotional or learning disabilities, and resort to violence to solve conflict. By age 15, substantial numbers of young teens are at risk for reaching adulthood unprepared to meet the requirements of the workplace, the commitments of relationships with family members and with friends, and the responsibilities of participation in a democratic society (Carnegie Corporation, 1989). Studies indicate that the dropout rates of urban middle school students climb steeply once they leave middle school (*This We Believe*, 1995). These social factors, combined with the natural emotional and physical changes of middle-grade students, pose difficult problems for educators of early adolescents.

In addition to the social and emotional challenges of middle-grade students, the academic challenges of the middle grades are increasing. A review of recent national and international performance of students in the middle grades reveals declining performance between fourth and eighth grades:

- Only 29 percent of the eighth-graders participating in the 1994 National Assessment of Education Progress scored at the proficient level in reading.

- The 1996 National Assessment of Education Progress for writing shows no significant difference in performance between the average scores for eighth-graders and their counterparts in 1984.

- The 1996 National Assessment of Education Progress demonstrates that white students outperform African American and Hispanic students in all areas. The magnitude of the gap between Hispanic students and white students in science, reading, and mathematics is increasing.

- The 1996 National Assessment of Education Progress indicates that the gap between male and females students in mathematics and science has increased as males outperform their female peers. This gap is reversed in reading and writing.

- The 1996 National Assessment of Education Progress for science shows no significant difference in average scores from those attained in 1970 by 13-year olds, while the scores for 17-year olds have an overall negative trend, and the 1996 average scores are lower than the 1969 scores.

- Thirteen-year-old students (eighth grade in writing) attending non-public schools outperformed their peers in public schools in all areas according to the 1996 National Assessment of Education Progress.

- U.S. eighth-grade students scored below the international average of the 41 countries participating in the 1995 Third International Mathematics and Science Study (TIMSS) despite the fact that they spend more time in mathematics and science classes than their international counterparts.

In addition to student performance data, information about middle-grade curriculum, teacher support, and attention to reform efforts contributes to a disappointing view of middle-level education.

- The content taught in a mathematics class in eighth grade in the U.S. is comparable to the content taught in seventh-grade classes in other countries, according to the findings of TIMSS.

- TIMSS indicated that the content of U.S. eighth-grade mathematics classes is not as challenging as that of other countries, and topic coverage is not as focused.

- Most mathematics teachers in the U.S. at eighth grade do not receive as much practical training and daily support as their counterparts in countries such as Japan and Germany, according to the TIMSS findings.

- Most eighth-grade mathematics teachers report familiarity with reform recommendations, yet only a few apply them in their classrooms. These reform recommendations are applied more consistently in Japan, the third highest ranking country in the 1995 TIMSS.

U.S. fourth-grade students are outperforming their international peers in every one of the 41 TIMSS countries except South Korea. Nine-year olds taking the National Assessment of Educational Progress are increasing their performance in science and mathematics. Yet, performance for 13-year olds declines dramatically. These downward trends underscore the urgency to reexamine instruction, curriculum, and staff development at the middle grades.

Together these data highlight the need for strengthening education for middle-level students. These results suggest that students need a more rigorous curricular program, teachers need more support and practical training in content knowledge and instruction, and classroom practices must be more consistent with reform recommendations.

Three additional factors complicate the effort to improve middle schools. *Turning Points*, a 1989 report from the Carnegie Corporation, reports that many teachers of middle school students dislike their work. "Assignment to middle school is, all too frequently, the last choice of teachers who are prepared for elementary and secondary education. Teachers view duty in the middle grades as a way station" (p. 61). Goodlad's *A Place Called School* (1974) cited career disenchantment among teachers in middle grades. Junior high school teachers were less satisfied with their careers than their colleagues in elementary or high schools (Lipsitz, 1984; Carr, 1989; and Scales, 1994).

Few teachers have the specialized preparation to teach in the middle. Since the U.S. middle school movement is fairly new, most teachers who teach in middle school were prepared either for elementary or secondary schools. Those who were prepared for secondary schools focused primarily on high-school-aged students. Yet, understanding the social, emotional, and cognitive needs of middle-grade students requires specialized study in early adolescent development.

Another factor influencing middle school reform efforts is the number of middle school teachers, particularly in math, science, and social studies, who are teaching out of their areas of preparation. The National Center for Education Statistics (1997) reports that nearly one-fourth of all secondary teachers do not even have a minor in their main teaching field. This is true for more than 30 percent of mathematics teachers and 17 percent of science teachers (Darling-Hammond & Ball, 1997). According to a report in *NEA Today* (September, 1997), over one-third of America's secondary math classes, which include both middle, junior, and senior high school, are taught by teachers who have neither a major nor a minor in math. This number almost doubles for social studies classes. And the number of teachers teaching out-of-field classes is significantly higher in lower-track classes, high poverty schools, and high minority schools (National Center for Education Statistics, 1997).

Intervening in the middle makes sense. Commenting to the National Advisory Panel for Results-Based Staff Development for the Middle Grades in 1997, Hayes Mizell, Director of Programs for Student Achievement at the Edna McConnell Clark Foun- dation, summarized the need to focus on the middle grades:

> If all students in the middle are going to achieve at significantly higher levels, they will have to participate in very different and more effective educational experiences than is now the case. . . .

The middle grades are a significant transition time for students. The majority of sixth-, seventh-, and eighth-graders continue to attend regular public schools. Most of these schools have yet to demonstrate that they can provide the very different and more effective educational experiences that enable all students to perform at higher levels. Most schools have neither the content nor performance standards to enable students to perform at higher levels.

Most of these schools have curricula a mile wide and an inch deep. Most of these schools do not have syllabi or a coherent scope and sequence of subject content. Most teachers do not use rubrics that clearly define what constitutes quality student work. Many teachers, especially in math and science, are teaching outside their field of pre-service specialization.

The Role of Staff Development in the Middle Grades

Research has confirmed what educators have known all along (National Commission on Teaching and America's Future, 1996). The better the teacher, the more successful the student. For decades the U.S. educational system has tried to improve student achievement through tinkering with "the great machinery of education." New management schemes, curriculum packages, testing policies, centralized initiatives, decentralized initiatives, new regulations, elimination of regulations, and special programs had little or no effect on student success (Darling-Hammond & Ball, 1997). What occurs each day in every classroom between teacher and student matters most. Distal factors (those furthest from classrooms) such as school management or district policy are not as significant to student achievement as proximal factors (those closest to students). Educators have known and are beginning to document that the knowledge, skills, and commitment of those who work most closely with students each day make the greatest difference in their achievement.

Darling-Hammond & Ball (1997) report on several studies that conclude that teacher expertise is the most important factor in determining student achievement. Forty-two percent of the variation in student achievement is explained by teacher qualifications. This is almost double the next closest factors of the level of parents' education, which accounted for 24 percent, and other background factors such as poverty, language, and family characteristics, which accounted for 26 percent. Size of school and classes accounted for 10 percent (Ferguson, 1991; Greenwald, Hedges & Laine, 1996). In a similar study in New York, a group of researchers attributed 90 percent of the variation in student achievement to differences in teacher qualifications (Armour-Thomas, Clay, Domanico, Bruno & Allen, 1989).

What constitutes teacher effectiveness is the teacher's content knowledge, understanding of the learning process and child development, and pedagogical skills

(Shulman, 1987). Druva & Anderson (1983) found that science teachers' effectiveness depends on two factors: the amount of discipline-specific training included in the pre-service preparation program and the quality of the staff development opportunities teachers experienced later in their careers. Hawk, Coble & Swanson (1985) found that teachers who had solid preparation in mathematics methods, curriculum, and teaching had students who performed better than those who were teaching out of their license or certification area or who were uncertified or not licensed to teach.

Staff development is an essential ingredient in student achievement. Ongoing development of teachers' knowledge and skills does matter (National Commission on Teaching and America's Future, 1996). Shulman (1987) suggests that teachers need three critical areas of knowledge. First, they need content knowledge—a deep understanding of their disciplines, typical of advanced study of the discipline. Second, they need pedagogical knowledge — knowledge about how to teach. And third, they need pedagogical-content knowledge — knowledge of subject-specific teaching strategies.

The dramatic changes in student population, public demands for reform in schools, expectations for increased student performance on tests and other forms of assessment, and achievement of rigorous content standards establish an overwhelming need for ongoing professional development. In addition, recent research on how the brain functions and how learning occurs at various stages of human development challenges many current assumptions about teaching and learning. These new findings produce a sense of urgency for "the creation of a staff development system that affects student learning" and "requires the coordination of the renewal of individual practitioners, school faculties, the district, and governing agencies" (Sparks, 1995, p. 1).

To face the complexities of educating middle-level students, teachers must engage in staff development that increases their knowledge and skills, challenges their beliefs and assumptions about education, provides support and coaching to develop comfort with new practices, and engages them as active participants in the study and reform of the school culture. Schools and districts have an obligation to provide a staff development program that engages education professionals in continuous renewal to ensure that all students receive the best possible education regardless of their race, ethnicity, gender, handicapping condition, family circumstance, where they live, level of income, or any other factor. Educators cannot afford to squander the future of middle school students.

Teachers who are lifelong learners are more likely to adapt to the growing demands and challenges of educating middle-grade students. Teachers who continue to extend their content knowledge and instructional strategies are better equipped to accommodate the diverse needs of middle grade learners. Teachers and other staff who collaborate with their peers in conducting research, sharing ideas, planning together, and analyzing student work are able to solve the problems they face in educating young adolescents.

Ashton & Webb (1986) concluded that collaboration among middle-level teachers reduces teachers' sense of powerlessness and increases their sense of efficacy. In a comparative analysis of the traditionally organized junior high school and a more progressive middle school with students of similar social backgrounds, students in the middle school achieved higher scores on measures of basic skills. In the traditional junior high school, teachers often identified student motivation or background as the predominant causes for students' poor performance. Teachers exhibited a greater sense of fatalism about student academic potential. In contrast, teachers in the middle school were convinced that they made a contribution to their students' lives and were committed to do so. They held stronger convictions about their role in developing the potential of students and recognized their responsibility for both the personal and the academic development of their students. These results, according to Ashton & Webb, can be attributed to the differences in teachers' sense of certainty and confidence in their contribution to improving student performance.

Particularly effective for middle-grade teachers are learning experiences designed to extend teachers' content knowledge and instructional strategies. Staff development practitioners for the middle grades can apply some strategies identified in research at the elementary level. In a recent survey of elementary mathematics teachers, Cohen & Hill (1997) suggest that "when teachers have significant opportunities to learn the content that students will learn in ways that seem to enable them to learn more about teaching the material — and when assessments are linked to the students' and teachers' curriculum — teachers' opportunities to learn pay off for their students' learning" (p. 61). Generic staff development that is unrelated to specific standards for students has no effect on classroom practice or student achievement (Cohen & Hill, 1997).

Although the Cohen and Hill research was conducted at the elementary school level, if this research study of elementary mathematics teachers holds true for middle-grade teachers as well, it marks a critical turning point for the design of staff development. Since many middle school teachers are teaching out of their area of content expertise and have little specialized preparation for working with early adolescents, staff development for today's middle school teachers must be tied directly to the content standards and the instructional strategies necessary to support student learning. Teachers need more practical knowledge and skills and more frequent and consistent classroom-based support, such as coaching and observation. Teachers also need ongoing opportunities to apply content knowledge and content-specific strategies in their classrooms with their students. This wake-up call for more content-specific staff development has as its single goal improving the achievement of all students.

Joyce & Showers (1995) describe a comprehensive professional development system that puts each educator with another in a coaching team, pairs three coaching teams into a study group of six, and engages whole faculties in the pursuit of school improvement. This comprehensive school-based program design recognizes that: (1) staff development is not a voluntary experience, but rather the expectation for all pro-

fessionals; (2) each professional is a valued, contributing member to the total school success; (3) a small number of enthusiastic individuals alone cannot sustain school reform; (4) all professionals have an obligation to contribute to the decisions regarding the design and delivery of professional development; (5) all members of a school community must assume responsibility for students' success; and (6) all professional development is a balance of individual, schoolwide, and districtwide components aligned with a common vision for improving student success.

Linking Student Achievement and Staff Development

According to Mizell (1997), "After decades of staff development experience; after annual expenditures of millions, perhaps billions of dollars for staff development; after many examples of staff development being subjected to the rigors of free enterprise, entrepreneurship, and the free market, what does staff development really amount to? What is there to show for it? If we can't make judgments now about what programs are and are not effective, when will we be able to do so? How much longer must teachers and students wait? How much longer must they struggle along while ineffective staff development is the rule rather than the exception, consuming precious resources and time?"

However, drawing a connection between staff development and student achievement is a daunting venture. Traditional research designs fall short of demonstrating the relationship between staff development and student learning. Educators must be prepared to devote considerable effort and resources to demonstrating the link between teacher learning and student achievement. According to Hein (1997), efforts to connect teacher behavior and student learning are extremely time consuming and costly.

According to Hein (1997), a key to demonstrating the link between staff development and student achievement is to look for evidence of change in teacher behavior and attitudes that result from staff development. Changes in behavior and attitude must be documented in order to establish the connection between student learning and teacher development. In other words, program evaluators must ask: What changes are evident in teachers as a result of the staff development program? How have those changes influenced student learning? This type of research is expensive. Perhaps this explains the virtual absence of research that establishes a relationship between teacher and student learning.

Curriculum reform, improvement in school organization, and increased resources will do little to influence student achievement if the staff working with students is inadequately prepared to face the demands of educating middle school youngsters. Comprehensive staff development incorporates appropriate instructional techniques and learning experiences for teachers and other staff. It adheres to high content stan-

dards. And, it provides sufficient time for learning, practicing, and planning for and debriefing implementation. In addition, staff development that influences changes in teachers' behaviors and beliefs focuses on content consistent with national standards. It demonstrates pedagogy that reflects current research about teaching and learning. It incorporates content-specific knowledge that relates to student experiences and environment. And, it is of sufficient duration to constitute a powerful intervention to alter teachers' behaviors and beliefs, and is part of a long-term, systemwide effort to improve the performance of teachers, schools, and students (National Science Foundation, 1995; Sparks, 1997).

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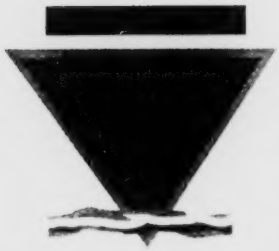

The Link Between Staff Development and and Student Achievement

"There is no question that staff development can raise student achievement when it addresses the academic content that teachers teach, their teaching repertoire, and the amount of practice they provide students in particular areas." (Bruce Joyce, director of Booksend Institute, in Sparks, 1998)

Demonstrating the link between staff development and student achievement challenges most evaluators. Although this connection may seem obvious, the proof that staff development leads to increased student achievement eludes evaluators. The link between staff development and student achievement is both intuitively strong and methodologically challenging.

Starting the Conversation

Results-Based Staff Development for the Middle Grades was launched to answer the question: Which staff development programs improve student learning? The National Advisory Panel discovered almost immediately that this work would generate more questions than answers. The myriads of questions were daunting at times; however, the painstaking process of considering all the relevant questions has made possible this collection of examples of staff development programs that provide evidence of impact on student learning. The National Advisory Panel hopes that this work will lead to further dialogue and learning that will benefit not only those who seek to answer the question for various constituents, but also students who ultimately benefit from teachers' learning.

What Works in the Middle: Results-Based Staff Development will help others who are trying to discover which staff development programs demonstrate an impact on student achievement. This chapter explores the challenges of evaluating staff development and summarizes the evaluation methods used by the programs included in the guide. The chapter also addresses the systemic nature of staff development and how it affects evaluation processes. In addition, the chapter discusses the difficulties of attempting to prove that staff development increases student achievement. Finally, the chapter discusses how the programs included in this guide have demonstrated that staff development influences student achievement.

Systemic Nature of Staff Development

To incorporate only staff development in an effort to improve student achievement is to tinker around the edges. Staff development is certainly necessary to increase stu-

dent achievement. However, staff development cannot be successful unless the system in which it occurs supports high levels of learning for both staff and students. When staff development is present — along with other factors that support quality staff development and student achievement — students' achievement increases.

Staff development is much like the respiratory system in the body. As one of the body systems, it is essential to the body's basic operation. But, to be fully functioning and healthy, the body needs all its systems working together. Removal or dysfunction of any system leaves the body in poor health and at risk. The same is true for school improvement efforts focused on increasing student achievement. To be successful, school improvement requires multiple systems to work together. These systems include staff development, compensation, teacher evaluation, student assessment, and many others. Eliminating any one system increases the risk that school improvement effort will be unsuccessful.

In addition, simply knowing that teachers participated in staff development and that student achievement increased does not prove that staff development was responsible for the increase. Multiple factors such as higher standards, improved curriculum frameworks, and new types of assessment are also associated with increased student learning. No one factor alone leads to increased student achievement. Because they are integrated simultaneously within a school system, none of these factors, including staff development, can be measured in isolation. It is nearly impossible in the complex social system of schools to determine if a particular factor was exclusively responsible for increased student achievement. Therefore, staff development leaders and decision-makers need to acknowledge the relationship of many factors rather than to attempt to show that staff development is a single cause of increased student achievement.

The evaluation of the programs in this guide is correlational, not causal. The programs in the guide demonstrate that a positive relationship exists between staff development and student achievement. However, a cause and effect relationship has not been verified. Staff development was present in all of the cases where student achievement was realized and is certainly one "systemic" element related to the documented increase in student achievement in each of the programs.

Evidence Not Proof

Rigorous experimental research to provide proof that staff development causes increases in student achievement is not possible in the complex social environment of schools. Too many intervening variables occur simultaneously, especially in schools engaged in systemic reform. If proof is not possible, Guskey (1998) suggests that evaluators of staff development collect evidence about the impact of staff development. Joyce (Sparks, 1998) suggests that we stop trying to select that elusive, "perfect" form for academic evaluation of staff development efforts. It is quite pos-

sible that new forms of evidence and new approaches to evaluation will need to be applied to demonstrate the link between staff development and student achievement. Instead, at this point, staff development leaders, researchers, and practitioners need to put on the table for discussion the issues about and examples of evaluations that demonstrate the impact of staff development on student achievement.

What is evidence of impact? This question appears simple but is laden with embedded values and beliefs. Prior to answering this question, evaluators need to understand that different audiences may want different answers to this question. For example, teachers may want to know how much effort a student expends on a particular academic task. Principals may be interested in knowing if students are coming to school and attending classes. Policy and decision-makers may want to know what the return on the investment is for expenditures in staff development. And, some audiences may not be interested in isolating staff development as the single factor that improves student achievement. Instead, they may be satisfied by simply knowing that when a school provides additional resources for reading, increases the instructional time for reading, and provides staff development designed to help teachers more effectively use the increased instructional time, student reading achievement increases. Responding appropriately to these various needs requires different forms of evidence and more flexible research designs.

Knowing what a school's, or district's, diverse audiences want to know about the relationship between staff development and student achievement will guide evaluators. Evaluators then need to select an appropriate research design and collect appropriate evidence of student achievement. Without baseline information about what information is needed, and for which audiences, evaluators will have a difficult time planning assessments.

What constitutes appropriate evidence of student achievement? The National Advisory Panel posed its own questions about what constitutes good measures of student achievement. For example, are standardized achievement tests with a standard error often exceeding five months powerful enough to measure increases in student learning? Or, what forms of assessment will measure increases in student achievement that result from changes in teacher content knowledge and instructional practice (e.g. greater use of inquiry or using writing in mathematics or science)? What evidence best demonstrates increases in student achievement? Must there be a standardized test, or will performances or authentic products, which meet prescribed standards, be sufficient to document student achievement?

The primary criterion for any project to be considered for inclusion in *What Works in the Middle: Results-Based Staff Development* was evidence of student achievement — what students know and are able to do. For the purpose of this study, indicators of

student achievement include measures such as norm-referenced tests, student portfolios, performance tasks, state assessments, local criterion-referenced tests, and increased enrollment and success in advanced-level courses. A full discussion of the measures of student achievement appears in Chapter 3, "The Selection Process." While these indicators are related strictly to students' academic success, evaluators might also evaluate whether their program goals require them to consider other indicators such as increased attendance , participation in class, satisfaction with school, or sense of self-confidence.

Evaluation Designs

Research designs to measure the impact of staff development on student learning are typically quasi-experimental or qualitative rather than experimental. Experimental research design allows the researcher to control for extraneous factors — those differences that exist in the subjects and environment that may influence changes in student achievement. It also requires random assignment of subjects to control and treatment groups. When staff development is implemented school-wide or district-wide and students are in intact classes, randomization is not feasible. The approach most similar to strict randomization is to assign teachers and classrooms to either experimental or control groups or to identify equivalent groups through statistical equalization.

The most common form of evaluation used in the 26 programs included in this guide is quasi-experimental. Quasi-experimental research is a form of experimental research done when the subjects are not randomly assigned to treatment and control groups. Qualitative research was used in one program. In qualitative research, researchers describe, interpret, and explain events in the real world. Of the 26 programs included in this guide, quasi-experimental and qualitative research designs were used in all but five cases. The exceptions randomly assigned classrooms and teachers, not students, to either a treatment or control group.

Some researchers who used quasi-experimental research accommodated for potential differences between control-treatment groups prior to the treatment. They conducted statistical measures of equivalency to demonstrate that both the control and treatment groups were similar. This process provides some compensation for the lack of random assignment to control and treatment groups.

Several research designs were used to demonstrate the link between staff development and student achievement. Table 1 presents the various evaluation designs used to demonstrate the link between staff development and student achievement in the 26 programs included in this guide. Along with a brief description of each design are the specific programs that used each evaluation design. If multiple measures of impact were conducted, some programs are listed more than once. The data sources or measures of student achievement are listed for each design. Table 1 also comments upon the strengths and limitations of each design.

Table 1: Evaluation Designs

Design	Data Sources/ Measures	Strengths	Limitations
Experimental			
1. Pre-post test with randomly assigned control/comparison and treatment groups (random assignment of teacher and/or classes) Programs using this design: • CRISS • Project LEGAL • Project Success Enrichment • Six-Trait + 1 • Student Team Literature	• norm-referenced tests • program-developed tests • state assessments	• measures growth • permits a calculation of significance • increases the generalizability of results • reduces the chance that the change is the result of other factors • accounts for differences in the groups before treatment • increases the ability to isolate the effects of staff development	• requires advanced planning • may not be possible to randomly assign groups in real-life contexts • results may be affected by pre-test (testing and sensitizing effect)
Quasi-Experimental			
2. Post-test only with non-equivalent/matched control/comparison and treatment group Programs using this design: • ECRI • FAST • HALP • Math Renaissance • National Writing Project • Rice University Student Mathematics Project • SPAN • SWRP • We the People ... Project Citizen	• norm-referenced tests • program-developed tests • state assessments • performance assessments with established scoring guides	• measures changes in achievement • permits a calculation of significance • eliminates testing effects (practice and sensitizing)	• does not account for difference in the groups prior to the treatment • requires advanced planning • may be difficult to select or identify a control group • does not account for other factors that may have contributed to the growth
3. Post-test only with equivalent/matched control/comparison and treatment groups Programs using this design: • Junior Great Books • We the People ... The Citizen & the Constitution	• norm-referenced tests • program-developed tests • state assessments	• measures changes in achievement • increases the generalizability of results • reduces the chance that the change is the result of other factors • reduces testing effects	• may be difficult to identify a control/ comparison group • requires advanced planning • does not account for differences in the groups prior to treatment

Quasi-Experimental			
4. Pre-post test with no control/comparison group Programs using this design: • EarthStorm • Fernwood Project • PUMP • RUSMP	• program-developed tests • state assessments • performance assessments with established scoring guides	• measures changes in achievement • permits a calculation of significance	• requires advanced planning • does not account for extraneous factors • does not permit generalizability to other programs • results may be affected by the pre-test (practice and sensitizing effect)
5. Pre-post test with nonequivalent/ matched treatment and control/comparison groups Programs using this design: • Iowa Chautauqua • National Writing Project • Profile Approach to Writing • Reading Power in the Content Areas	• norm-referenced tests • program-developed tests • state assessments • performance assessments with established scoring guides	• measures growth • permits a calculation of significance • increases ability to isolate the effects of staff development	• control/comparison and treatment groups may differ prior to treatment • results may be affected by the pre-test (practice and sensitizing effect)
6. Pre-post test with equivalent/matched control/comparison and treatment groups Programs using this design: • ELOB • Junior Great Books • Powerful Connections • RUSMP	• norm-referenced tests • state assessments	• measures growth • permits a calculation of significance • increases the generalizability of results • reduces the chance that the change is the result of other factors • accounts for differences in the groups before treatment	• changes may be the result of the pre-test (practice and sensitizing effect) • may be difficult to identify a control group • requires advanced planning
Qualitative			
7. Case study Programs using this design: • Introducing Math Teachers to Inquiry	• performance assessments with established scoring guides	• describes changes that occur as a result of the intervention	• does not account for other factors that may have contributed to the changes • does not permit generalizability to other programs

Body of Persuasive Evidence

The search for persuasive evidence to demonstrate the link between staff development and student achievement was one goal of the Results-Based Staff Development for the Middle Grades initiative. The search resulted in identifying 26 staff development programs with evidence of increased student achievement. Individually these efforts may not be persuasive; however, as a collection of studies across a wide span of subject areas, in many diverse settings, and with different measures of student achievement, they provide convincing evidence that staff development is strongly related to student achievement.

Even though the relationship between staff development and student achievement is logically and intuitively sound, identifying a body of evidence to support that a strong relationship exists is not easy. Additional evidence to support this body of research is important. Evaluators, staff development leaders, and program coordinators must join forces to monitor, gather additional evidence, and communicate the results of their work to extend the evidence presented in this guide.

Limitations of This Work

The studies included in this guide have a number of methodological flaws and, in some part, are evidence of a single year's results rather than multi-year, longitudinal studies. What they do represent are significant attempts to answer the question: Does content-based, results-based staff development for middle-grades teachers increase student achievement?

While *What Works in the Middle: Results-Based Staff Development* does not provide conclusive proof to support the link between staff development and student achievement, it provides evidence that there is a strong link between them. Further, it suggests that additional study of appropriate ways to demonstrate this relationship is necessary. These staff development programs help construct an answer to the question: Does staff development make a difference? What they do not help us know is how much difference it makes. Nor does this work answer questions about what aspects of the staff development program contribute most to teacher and student learning. There are strong patterns or similarities among these programs described in Chapter 5, "Common Characteristics of Programs in the Guide." Yet more research is needed to determine if these similarities are responsible for the success of the programs included in this guide.

To build additional support for the hypothesis that teacher learning increases student learning, both practitioners and researchers must expand the body of evidence drawn with other evaluations from disparate situations, identify the best ways to document the increased student achievement, and determine if it is possible to demonstrate how much staff development impacts student learning.

WALK ... DON'T RUN

Lifeguards at neighborhood pools, where eager kids gather to enjoy the cool, refreshing waters on a hot summer day, spend almost all day saying: "Walk; don't run" or "Slow Down!". Children, in their enthusiasm to get into the water, often disobey the rules posted on fences and in locker rooms. Too often, educators, in their enthusiasm to initiate innovations to improve student performance need the same cautions and reminders:

WALK; DON'T RUN. SLOW DOWN!

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Part Two

Staff Development Program Descriptions

The Selection Process

The process for identifying and selecting the programs included in this guide involved establishing the criteria for inclusion, identifying potential programs, and reviewing submitted programs.

Establishing Criteria for Nomination

Four criteria were established in 1997 by the National Advisory Panel. While the criteria are unique to this study, they provide other educators — especially those on school improvement teams — with a beginning point for examining any staff development programs under consideration. The criteria are:

1. Results measured in terms of student performance;
2. Well-defined staff development program;
3. Content-specific staff development designed to improve middle-grade teachers' content knowledge and/or content-specific pedagogical skills; and
4. Program occurs at multiple schools or within district, state, or regional areas.

Criterion One: Results Measured in Terms of Student Performance

The National Advisory Panel reached consensus that evidence must be demonstrated of what students know and are able to do. The evidence of student achievement had to be academic rather than based on student attitude, classroom behavior, or exhibition of learning processes. The panel members decided that changes in reasoning skills, inquiry, discourse, or student attitude alone are insufficient to warrant consideration for inclusion of the program in the guide. This meant, for example, that an increase in students' participation in class or evidence of higher-order thinking skills was not sufficient as evidence of student achievement. They further agreed that student report cards or teacher reports of student learning did not adequately demonstrate student achievement. In addition, panel members agreed that evidence was strengthened when data from multiple-year efforts, multiple sources, and/or sub-populations were available and showed positive changes. Longitudinal data were not required.

In determining the type of evidence that would demonstrate increased student achievement, the National Advisory Panel members agreed that positive changes in the following would serve as evidence:

- Standardized achievement tests
- Portfolios
- Exhibitions
- Performance tasks
- Performance events
- State assessments
- Local criterion-referenced tests
- Participation in non-school academic events
- Participation in higher-level courses
- Other products for which there is a defined standard of quality and training for those who will conduct the assessment.

Teacher enhancement programs whose goal was to change teachers' content knowledge, instructional practices, and/or attitudes were not reviewed unless their intended result was to change student achievement. Programs initially developed to provide curriculum and instructional materials and resources rather than to provide staff development to extend teachers' content knowledge and/or content-specific pedagogical processes were eliminated from consideration.

Evidence of student achievement was the first screen for programs and also the one that caused the most programs to be eliminated. Of the approximately 500 programs that were identified as content-specific staff development initiatives for middle-grade teachers, fewer than one-fifth merited a closer examination. Approximately 80 programs met this and some other criteria and provided some documentation for further study. Half of the approximately 80 projects that had evidence of student achievement qualified for a more extensive review process, and only the 26 that are included in this volume ultimately met all criteria.

Criterion Two: Well-Defined Staff Development Program

Criterion two is a well-developed staff development program. This criterion was not as challenging for programs to meet. As a matter of fact, many of the 80 programs reviewed had strong staff development programs.

To review the staff development associated with each program, the National Advisory Panel members examined each program's goals, syllabi, sample materials, time allocation, content, processes, and follow-up.

Most of the programs use the training model of staff development, with follow-up that includes classroom-based coaching, feedback, and ongoing support meet-

ings for participating teachers. A large number of the programs provided training during summer intensive workshops of two to five weeks with follow-up provided during the school year.

Using the National Staff Development Council's *Standards for Staff Development: Middle Level Edition*, the National Advisory Panel identified the following characteristics of well-defined staff development programs to evaluate the programs:

Content

- Intends to change pedagogy, current knowledge of the content area, and teacher belief systems
- Aligns with the content-area standards
- Provides for parent learning

Process

- Is a defined, discrete program
- Provides evidence of changes in pedagogy, content-area knowledge, and belief systems
- Is grounded in research, theory, or best practice
- Provides clear goals/purposes
- Is based on an assessment of needs
- Engages teachers and students
- Is a continuous model implemented over time
- Accommodates adults' learning styles
- Includes coaching/reflection/feedback
- Includes follow-up
- Identifies student activities
- Establishes procedures for teachers

Context

- Involves supervisory and support staff
- Describes the school/department/unit culture
- Extends to multiple classrooms, entire school, or multiple schools

These characteristics parallel the content, process, and context standards included in NSDC's standards. No staff development program included all these characteristics. Few, in fact, included most. A matrix on page 184 identifies which of the NSDC standards each program meets.

The second criterion eliminated a number of curriculum development or implementation projects. Because the focus of the study was staff development, curriculum programs *without* extensive staff development were not considered.

The National Advisory Panel found critical differences among programs providing curriculum, instructional materials, and resources. Criterion Two requires that a solid staff development component accompany such programs. For example, Foundational Approaches in Science and Technology (FAST) is designed to provide curriculum, instructional materials, and resources, but it is also coupled with mandatory and extensive staff development. FAST, a total package, demonstrates that when both staff development and challenging and developmentally appropriate curriculum are implemented, student achievement increases. On the other hand, *Connected Mathematics*, a well-received mathematics curriculum, is available in textbook form and can be purchased from the publisher without implementing or purchasing a staff development component. Although most mathematics specialists agree that training in using *Connected Mathematics* is essential to its success, such training is not required or monitored for quality or consistency by any agency.

Criterion Three: Designed to Increase Teachers' Content Knowledge and/or Content-Specific Pedagogical Skills

This criterion eliminated the second largest group of programs considered. The focus of Results-Based Staff Development for the Middle Grades was *content-specific* staff development in language arts, mathematics, science, and social studies. Content-specific staff development is essential because previous efforts in staff development that have focused on instructional processes or management strategies devoid of content have been less effective in improving student learning. Therefore, a shift in thinking in staff development has occurred in recent years. Shulman (1987) suggested that teachers need three kinds of knowledge: knowledge about their content area; knowledge about pedagogical strategies; and knowledge about content-specific pedagogical processes. Although there are a number of staff development programs that are more general in nature, these programs were not considered unless the content of the staff development extended teachers' content knowledge and repertoire of content-specific instructional strategies.

Staff development for the past 20 years has focused almost exclusively on developing more general pedagogical processes. Teachers often find it difficult to apply general processes to specific disciplines without specific support for adapting the strategies to various curricular areas. While many programs in cooperative learning, learning styles, and instructional processes have enriched teachers' pedagogical processes, they have not specifically deepened teachers' personal knowledge of their disciplines.

As a result, teachers are often process rich and content poor. This is particularly true in the middle grades where many teachers might not have academic majors

in the subjects they teach and are teaching out of their content areas, or have not had opportunities to keep abreast of the rapid changes in the content areas, especially in science, mathematics, and social studies (National Commission on Teaching, 1996; Condition of Education 1997).

The third criterion allowed panel members to take a unique look at staff development. Since most evaluations of staff development efforts have focused on general instructional processes, this criterion underscored the importance of tailoring staff development to help teachers address the new content standards. In addition, many of today's teachers were students 10 to 20 years ago, and they find that expectations for students today are much higher than those that they experienced as students.

Criterion Four: Occurs at Multiple Schools or Within District, State, or Regional Areas

The fourth criterion established by the National Advisory Panel is that the selected programs are current and ongoing at multiple schools, districts, regions, or states. Again, this criterion eliminated a number of individual school efforts to improve student performance. The National Advisory Panel's goal was to identify model programs that other schools or districts might replicate, adapt, or use as models. Recognizing that unique conditions or factors at individual sites, such as an exceptional school leader or particularly dedicated staff, may often be the source of a program's success, the panel looked for programs that had been implemented at a number of schools to reduce the "site-effect."

Many locally developed programs have been enormously successful in improving student achievement. However, successful replication across sites suggests that a program's accomplishments are less dependent on the characteristics of an individual school and more related to the design of the staff development effort. Most programs included in this guide have a national- or state-level scope, although several district efforts are also included.

Identifying Programs

After the criteria were established, the process of identifying programs began. By October 1997, almost seven months into this effort, no programs that met all four criteria had been identified. Some panel members were certain they would have the slimmest volume ever published. The project director had a nightmarish vision of a beautiful cover with nothing inside! Two or three programs identified early in the process were quickly eliminated by the National Advisory Panel because they did not meet the established criteria. Through the process of reviewing the early programs, the criteria were refined and solidified.

Gradually, an extensive "call for programs" — posted on Web sites, published in professional journals, and shared by word-of-mouth — brought responses, and with the assistance of a large contingency of supporters, a number of programs were eventually identified. Programs with potential for inclusion emerged as the panel members considered programs from the National Diffusion Network, the Teacher Enhancement database maintained by TERC, professional development resources compiled by the Eisenhower National Clearinghouse for Mathematics and Science, and listings of grants awarded by the Office of Evaluation and Research on Improvement from the U.S. Department of Education and the National Science Foundation.

Particularly useful in the search for programs were past editions of *Educational Programs That Work: The Catalogue of the National Diffusion Network*, published annually by the National Diffusion Network (NDN) with support from the Department of Education. Since its inception in 1974, the NDN grew to include over 200 programs in its catalogue. The catalogue provided synopses of programs that were approved for inclusion by the Program Effectiveness Panel (formerly the Joint Dissemination Review Panel). To be approved, program developers submitted evidence of their program's effectiveness in meeting its goals and of its ability to be replicated. The National Diffusion Network was disbanded in 1996.

Reviewing Programs

After the information for a program was received, the project director reviewed the documentation submitted. If a preliminary review revealed that sufficient evidence was available to demonstrate that all criteria were met, the program qualified for more intensive review. Of the nearly 80 programs initially reviewed by the project director, only half went on to the next step of the review process. A program summary sheet was compiled that highlighted key aspects of the program. This summary sheet was used in the next level of review.

If a program met all four criteria, it was then sent to the appropriate content-area review team, a sub-committee of the National Advisory Panel. The review teams were people with expertise in a core content area and representatives of the professional associations for each discipline. For example, the mathematics projects were reviewed by the two representatives of the National Council for Teachers of Mathematics who served on the National Advisory Panel and by at least two others who had expertise in the discipline. Review team members could recommend to include the program, seek additional information, or eliminate the program. In almost every case, the questions that arose or the reasons for elimination related to the student achievement data or the design of the staff development program. If additional information was needed, the project director contacted the

developer to request the necessary information. The project director then determined if the information was sufficient to answer the questions of the reviewers. In some cases, new information was circulated to reviewers before a final decision was made.

Following each team's review and the compilation of the additional information reviewed, program abstracts were developed. These program abstracts were then shared with the Expert Review Council, a group of 26 middle level and content-area experts, who provided feedback on each project and validated the program's success. In addition to the Expert Review Council, Reflector Groups were convened at various places throughout the country, often at annual conferences of the collaborating associations. Reflector Group members provided feedback on the content of the abstract and the format of program descriptions.

This extensive review process has increased the likelihood that the programs included in this guide are examples of middle grade, content-specific staff development programs that have increased student achievement and that can be replicated, adapted, or used as models for designing professional development. Of course, having completed the review process does not guarantee that these programs will be successful for every school. It does, however, suggest that based on the information available to reviewers, these programs have the potential to improve teachers' content knowledge, content-specific pedagogical processes, and student achievement if programs are selected and implemented appropriately.

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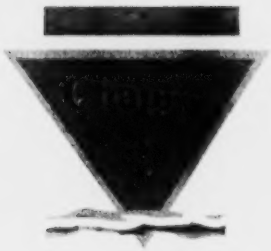
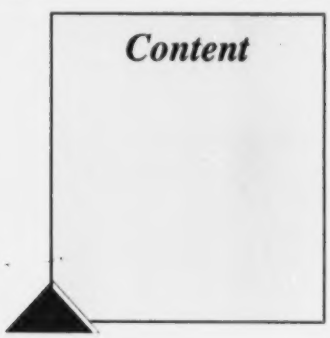


Reading the Program Descriptions

Each of the 26 programs that met the National Advisory Panel's rigorous criteria is described in the next five chapters. The language arts programs are divided into several sections: those related to the study of literature appear first; those that relate to language skills appear next; and those which address writing are last. The mathematics, science, social studies, and interdisciplinary programs are in subsequent sections. Each chapter begins with a table of contents to introduce the titles of the programs. Although some programs included in the content-area chapters could be interdisciplinary in nature, they were included in the content-area chapters because of their strong focus on a particular content area. The descriptions are consistent in format and provide a variety of information to help staff development leaders learn about each program and understand how each meets the criteria for inclusion in *What Works in the Middle: Results-Based Staff Development*. Information includes:

Program Description

The program description provides an overview of the program. It describes key features of the program in a succinct format to help staff development decision-makers understand how the program contributes to increased student achievement.



The content of the staff development program, what adults will know and will be able to do is summarized for each program in the content box.

Program Context

This section identifies demographic characteristics of the school and district sites where the program has been successfully implemented. It provides information about the location of the schools and districts (rural, urban, suburban) and the student population.

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Many programs included have been implemented in a wide variety of school and district contexts. Consequently, the context or site characteristics are less likely to be a predominant factor contributing to the program's success. The box accompanying this section highlights some of the student and site characteristics associated with this program.

Context

Staff Development Program

This section contains information about the design of the staff development program. It explains how the learning experience is structured, how much time is allocated to staff development, and how follow-up is provided.

Accompanying this section is a box that highlights the key processes used throughout the learning experiences. For example, it identifies the various models of staff development incorporated and the follow-up included.

Process

Summary of Results

This is a brief statement that summarizes the results of the program. It can be used as a quick reference.

Intended Audience

This box identifies the staff and individuals who most often participate in the staff development program. Program developers, in some cases, identify the participants. Some programs are specifically designed for entire school staffs and may not be available to individual teachers. Others are designed for teams or departments to use. Some are available to individual volunteer teachers.

Intended Audience

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Evidence of Student Achievement

This section briefly describes the methodology and results of the study or studies conducted to demonstrate how staff development is related to student achievement. For those interested in evaluating staff development programs, this section will be most useful.

A box contains the sources of evidence used to measure student achievement and, thus, indirectly to determine the effectiveness of the staff development program Staff development decision-makers will notice the variety of measurements used to assess student achievement such as norm-referenced tests, state assessments, program-specific tests, and so on.

The Bottom Line

This section provides a commentary on the program from the National Advisory Panel and project director. In addition, this section contains a rating system for the staff development component of each program. Using the National Staff Development Council's *Standards for Staff Development: Middle Level Edition*, the project director identified which standards each program met.

Readers will notice on the matrix which summarizes the standards met, that context standards are missing for many programs. Readers should note that programs, rather than an individual school's or district's implementation of the program, were analyzed. It is possible that more programs do meet at least some standards; however, if they were not explicitly a part of the program's design feature, they are not checked off in the matrix (page 184, Table 6).

NSDC STANDARDS RATING

Stars depict how well each program meets the National Staff Development Council *Standards for Staff Development: Middle School Edition*.

✪✪✪✪✪
Five stars indicate that the staff development component meets 22 - 27 standards.

✪✪✪✪
Four stars indicate that the staff development component meets 16 - 21 standards.

✪✪✪
Three stars indicate that the staff development component meets 10 - 14 standards.

✪✪
Two stars indicate that the staff development component meets 5 - 9 standards.

✪
One star indicates that the staff development component meets 1 - 4 standards.

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School Sites

This section lists middle-grade schools that have agreed to be identified as implementers of the program. For each school, a contact person and information on how to contact him or her is listed. These people and schools have agreed to provide *information about how they* are implementing the program.

Key Contact Person

This is the person who will provide further, more detailed information about each program. In most cases, this is the person who is the primary developer of the program. The Web sites are easy ways to learn more about the programs.

KEY CONTACT PERSON . . .

Name
Organization
Address
City, State & Zip Code

Phone:

Fax:

E-mail:

Web site:

DOCUMENTATION

Documentation

This section lists the articles, papers, and other sources of information used to determine each program's success. Other related articles and papers about a program may be cited here.

Content Area Standards

A matrix that includes which national content standards each program meets appears at the end of each content area section. The content standards used are those published by the professional associations represented on the National Advisory Panel. They include:

- National Council of Teachers of English
- National Council of Teachers of Mathematics
- National Council for the Social Studies
- National Science Teachers Association

Program directors for each program determined the content standards their programs meet. Most program directors indicated that their programs meet a majority of the standards, however, the depth to which the standards are addressed varies. Some standards may be given more attention than others are. For a few programs, in fact, it is not possible to specify which content standards are addressed since teachers have the discretion to select the specific content standards they focus on throughout the staff development program.

It is important that the reader understand what this guide IS and IS NOT.

The guide is a compilation of 26 outstanding staff development programs in the core content areas. It is not a comprehensive list of all staff development programs available for middle-grade teachers. Hundreds of programs exist that have not been examined by the review teams for inclusion in this book. In general, the panel's search for programs uncovered more national programs and fewer that were developed by local school districts. Possibly, there are many undiscovered local programs that could meet the rigorous review criteria. Identifying programs and getting complete information were two of the most challenging aspects of this initiative. Even as late as a few weeks before publication, programs continued to surface. Or program developers who previously had no evidence of student achievement had collected evidence and were eager to share it. The high level of interest expressed by educators points to the need for a continuing study of middle school staff development programs and the need to expand to include elementary and high school levels as well.

The guide reports the results of 26 staff development programs. The programs included in the guide are not, however, endorsed by the National Staff Development Council or any of its partner associations. The guide reports program results. The information used to select the programs was supplied primarily by the developers. Some programs offered third-party evaluations. Others had received recognition from other associations or had been selected for inclusion in the National Diffusion Network. The review of the work was primarily dependent on paper documentation. The Advisory Panel did not conduct an evaluation of

each program or make individual site visits to study each program and school. Although the assumption is made that all information included is accurate and based on ethical evaluation practices, readers are urged to conduct their own careful analysis before adopting any program included.

The guide is a catalog for ideas. It is not a catalog for shopping. It is always possible that a school could misuse this guide and adopt a program for implementation without thorough analysis and study. To use this guide responsibly, school teams or staff development leaders must complete a preliminary analysis of what is needed and how best to meet the needs of students, educators, and each school's community. After this preliminary study is complete, the guide can provide suggestions and guidance for adopting, adapting, or designing successful staff development.

The guide identifies common characteristics of the programs. It is not, however, a meta-analysis of the programs included. Although the information for some programs was insufficient to allow a reliable statistical comparison, the guide does attempt to identify common characteristics of programs and search for patterns of effectiveness.

The guide is a description of what staff development *is* and *has been*. It is not necessarily a picture of what staff development *should be*. Many of the programs included here are based on the training model of staff development. While training as a model of staff development is efficient and often quite effective, it is just one model of learning for adults. A need exists to better understand and incorporate other models. As new information emerges from practice and research, staff development processes and content will evolve and improve.

The guide describes programs currently used at specific middle school as examples. It is not a list of exemplary middle schools. The program developers recommended the schools listed as sites for each of the programs. Most are honored to be selected for inclusion. All have given their permission to be included as schools where the staff development programs have been implemented. Further, they have offered to share information about their involvement with others. Panel members did not visit each school and do not have information about a school's overall effectiveness.

Those involved with the initiative trust that the information within this resource guide will be useful to all its potential audiences. The guide should assist those who make decisions about staff development to become more aware of the critical nature of their decisions and the need to use the information contained here in a responsible manner. Suggestions for making those decisions are provided in Chapter 6, "How to Use This Guide."

Language Arts Programs

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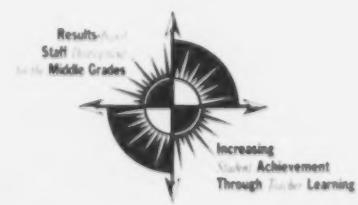

Overview
Language Arts Staff Development Programs

Faith Schullstrom, National Advisory Panel, National Council of Teachers of English

Language arts is a broad content area that includes reading, writing, speaking, listening, viewing, and visually representing — all forms of language in use; all vital to student success in school and beyond. The programs in this section are divided into those that relate to reading, writing, and language skills. Although no programs cited address the results in the areas of speaking, listening, viewing, or visually representing, some give attention to these areas.

The National Advisory Panel's search of professional development programs found no comprehensive language arts programs. Instead, the language arts programs included in *What Works in the Middle: Results-Based Staff Development* demonstrate an impact on improving student performance in certain aspects of a total language arts program. Schools and districts should consider the specific learning needs of students and the professional development needs of teachers; look closely at the parameters of the results found; and select programs that leverage efforts to provide a comprehensive language arts program that is proven to raise students' achievement in areas of significance.

To provide a language arts program that assures that all students develop skills and confidence and enables them to be successful at the next level of schooling requires that teachers have well-grounded and comprehensive content knowledge and pedagogical skill. It is also critical that middle school students have instruction, curriculum, and experiences that develop their competence in using language to understand and express their understanding of increasingly complex ideas and concepts — in all disciplines. When language arts is integrated with other disciplines, it is essential that the integrity of the discipline be maintained to support the continuing growth and development of student competency in using language effectively.

The programs included in this section have the potential to be replicated in other schools and districts and will lead to increased student achievement when they contribute to a balanced course of study in the language arts that is consistent with the national standards for English Language Arts published by the National Council of Teachers of English and the International Reading Association.

Junior Great Books

Language Arts

Program Description

Junior Great Books is a professional development program designed to help teachers develop inquiry-based instructional strategies in reading, literary analysis, and critical thinking. The shared inquiry method develops students' reading, communication, and thinking skills. Shared inquiry engages students in lively, structured discussion of authentic literature. During the discussions students engage in a genuine investigation to find the meaning of the literary piece being discussed. Written and oral interpretive activities supplement the structured search for meaning and can be applied in every stage of the reading and writing process.

Content

- shared inquiry
- literary analysis and interpretation
- critical and creative thinking skills
- use of Junior Great Books literature

The staff development provided for teachers, administrators, volunteers, and parents focuses on developing skills to conduct shared inquiry with students and using the interpretive activities to extend the search for meaning. The Great Books Foundation has excellent collections of student literature to use in the shared inquiry process and also provides teacher resource materials to support the implementation of Junior Great Books in classrooms.

The Junior Great Books Program has been used in schools throughout the country since 1962. The program was certified as an effective program by the National Diffusion Network, U.S. Department of Education, in 1992.

Program Context

Junior Great Books has been implemented throughout the country in all types of schools and with all levels of students. The specific studies described in the "Evidence of Increased Student Achievement" section of this abstract were conducted in urban settings with a large number of minority students and in suburban schools with limited diversity.

Context

- wide range of states, districts, and schools
- diverse student populations
- supplement to or replacement of regular curriculum

Staff Development Program

Junior Great Books Program involves several levels of training and support for classroom teachers. The Basic Leader Training Course is a beginning level, two-day course that provides concrete, step-by-step instruction in how to use the shared inquiry method with Junior Great Books materials. This course prepares teachers to lead a shared inquiry discussion and daily interpretive activities with students of all ability levels. Specifically, the training focuses on the questioning and listening strategies to keep discussions lively and focused, follow-up questions to help children develop and support their own ideas, techniques for meeting the needs of students of all ability levels, and before- and after-discussion activities to reinforce reading and discussion and to build children's thinking and writing skills.

In addition to the Basic Leader Training Course, intermediate and advanced level workshops are available for those who wish to explore integrating Junior Great Books interpretive activities into the classroom curriculum and to learn how to assess student writing and discussions.

Training is provided by the Great Books Foundation staff throughout the United States and is arranged through the Junior Great Books Foundation.

On-site follow-up and consultation is also available to provide school-based support, including classroom coaching and demonstration lessons for those implementing shared inquiry and interpretive activities.

Process

- training
- demonstration
- analysis of Junior Great Books materials
- integration of Junior Great Books into existing curriculum
- classroom-based coaching
- consultation and support

Intended Audience

- entire school
- entire department
- individual volunter teachers

Summary of Results

The Junior Great Books Program improves students' critical reading, literary analysis, and critical thinking processes as a result of engaging in shared inquiry.

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Evidence of Increased Student Achievement

Success Indicators

- Norm-referenced reading assessments
- Ross Test of Higher-Order Thinking Skills
- Worden Critical Thinking/Reading Appraisal

Two studies document the success of the Junior Great Books Program in increasing student achievement. A recent study by David Kerbow of the University of Chicago's Center for School Improvement determined that students' ability in reading comprehension increased as a result of their participation in Junior Great Books. 51 teachers in 11 schools in the Chicago Public Schools who participated in the Junior Great Books training in 1995-96 are included in the study. Students in Junior Great Books classrooms outperformed the control students at all grades with statistically significant results at fifth grade ($p<.01$) and eighth grade ($p<.001$). Control classrooms were matched with Junior Great Books classrooms based on similar achievement level in prior grade levels with similar racial composition in schools with comparable percentage of low income students.

A second study examined the impact of the Junior Great Books shared inquiry process on high ability fifth-graders. Students whose teachers used Junior Great Books as either a full-time or part-time replacement for the regular basal reading program performed significantly better on the Ross Test of Higher Order Cognitive Processes and the Worden Critical Thinking/Reading Appraisal. Students in control classrooms were matched to those in Junior Great Books classrooms based on reading ability and socio-economic status.

Other evidence indicates that Junior Great Books increased students' performance on the Texas Assessment of Academic Skills in areas of generalizations and inferences and relationships and outcomes.

THE BOTTOM LINE

The longevity of the Junior Great Books program (37 years), continuous improvements to the program over time, extensive nationwide implementation, and the availability of multiple measures of reading performance make it easy to substantiate the claim that this staff development program improves student achievement in the language arts. The program has been used in schools throughout the United States since 1962 with remarkable results. Few staff development programs can match the history of success of Junior Great Books.

60

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800-222-5870

Fax: 312-407-0334

E-mail: jgb@gbf.mhs.compuserve.com

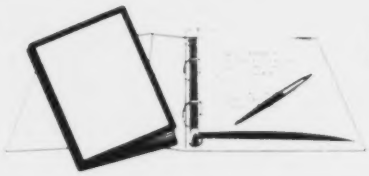
Web site: www.greatbooks.org

DOCUMENTATION

Bird, J. (1984). *Effects of Fifth Graders' Attitude and Critical Thinking/Reading Skills Resulting from a Junior Great Books Program.* Unpublished dissertation. Rutgers, The State University of New Jersey.

Biskin, D., Hoskisson, K. & Modlin, M. (1976). Prediction, reflection, and comprehension. *The Elementary School Journal, 77,* 132-139.

Kerbow, D. (1997). *Preliminary Evaluation of Junior Great Books Program Chicago Elementary Schools: 1995-1996 School Year.* Unpublished manuscript. Chicago: Center for School Improvement, University of Chicago.



Student Team Literature

Program Description

Content

- literature analysis
- reading skills
- integrating the language arts
- instructional practices
- cooperative learning strategies
- higher-order thinking skills
- assessment strategies
- school-wide reform

The Student Team Literature program (STL) is a middle school language arts curriculum and instructional program designed for sixth-, seventh-, and eighth-grade students as a component of the Talent Development Middle School reform initiative. STL is designed to improve students' skills in reading, vocabulary, literary analysis, and student collaboration by using great books, higher-level questioning, working with other students, and a wide variety of instructional and curricular materials. The program avoids short anthology selections and literal comprehension questions. STL includes (1) curricular materials to assist students' study of great literature; (2) recommended instructional practices, peer assistance processes, and assessments; and (3) staff development, mentoring, and advising for teachers to support the curricular and instructional reforms.

Student Team Literature is an adaptation of previous cooperative learning programs in language arts that have been successful in raising student achievement in reading and writing. STL is an adaptation of Student Team Reading and incorporates instructional practices used in Student Team Writing; these programs were originally developed to address the specific instructional and developmental needs of middle grade students.

Program Context

Context

- urban middle school
- low-income, high-minority populations of students

The Student Team Literature program was implemented in 1995-96 in 21 classrooms in sixth through eighth grades at Central East Middle School in Philadelphia. Additional schools are now involved. Central East Middle School serves 1,000 students in fifth through eighth grades. Over 85 percent of the students are from low-income families. The student population at Central East Middle School includes a large percentage of second language learners and minority students.

Staff Development Program

The comprehensive staff development program employs both the training and observation and assessment models of staff development. Training occurs both in the summer (2 days) and monthly throughout the year. The summer workshop provides a baseline of knowledge and skills in establishing peer learning structures within the classroom and in using interactive instructional strategies. Additionally, teachers in the STL program participate in monthly seminars to troubleshoot problems with instruction and to extend their knowledge and skills in the Student Team Literature's program instructional strategies and support materials. Teachers receive biweekly coaching following classroom observations by an expert instructional strategy specialist. Periodically, small groups of teachers convene to review the instructional materials. In March of the same school year, teachers also receive training in Student Team Writing, a related instructional model.

The staff development activities are provided by the Talent Development Middle School Program staff, local teacher leaders, and school and district-based experts in curriculum and instruction.

Process

- training
- demonstrations
- modeling
- classroom-based coaching
- periodic review sessions

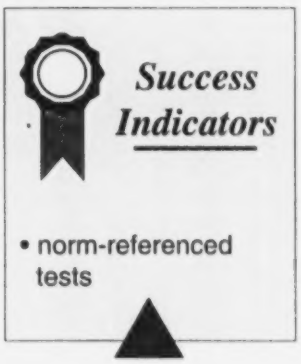
Intended Audience

- entire school
- entire department or team

Summary of Results

Students in the Student Team Literature classrooms displayed significantly better reading comprehension after the first year of implementation (effect size .51) than did students in the comparison group. The increase in reading comprehension occurred across all levels of prior ability; students with the strongest prior reading skills benefited the most. Peer assistance was found to be more productive and frequent in STL classrooms than in the control classrooms.

Evidence of Increased Student Achievement



A matched control group, pre-test/post-test design was used to evaluate effects of Student Team Literature on students' end-of-the-year reading comprehension scale scores on the Stanford 9. Researchers used hierarchical linear models to estimate the differences between experimental classrooms (21) and control classrooms (25) in reading comprehension, while controlling for prior achievement and current grade level. Additional measures were used to estimate the difference in the effectiveness of peer assistance in increasing reading comprehension in experimental and control classrooms.

While the results for Student Team Literature are based on one school's use, earlier research on Student Team Reading (the first version of Student Team Literature) was extensive. It demonstrated significant improvement ($p<.05$) in the California Achievement Test Total Reading for 1,223 urban sixth-grade students in six middle schools when compared to control classrooms where traditional reading instruction was provided using basal and isolated skill instruction. In addition, a second study of the Student Team Reading Program paired with the Student Team Writing Program in sixth-, seventh-, and eighth-grade classrooms with 3,986 students in the Baltimore City Schools, resulted in significant improvements (at least $p<.05$) in reading comprehension, vocabulary, language mechanics, and language expression on the California Achievement Test when compared to match control schools. These results were obtained even when the control schools had significantly higher pre-test scores ($p<.01$) in Total Reading and Total Language.

Student Team Literature is one part of the larger Talent Development Reform effort for middle schools, and it has produced results for students in this context. Previous versions of Student Team Literature have been used independently of whole school reform efforts and have demonstrated their impact on student learning. The structured, interactive approach to student analysis of literature engages students in responding to literature.

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DOCUMENTATION

Mac Iver, D., Plank, S. & Balfanz, R. (1997, August). *Working Together to Become Proficient Readers: Early Impact of the Talent Development Middle School's Student Team Literature Program, Report No. 15.* Baltimore, MD: Center for Research on the Education of Students Placed at Risk, Johns Hopkins University and Howard University.

Exemplary Center for Reading Instruction

Program Description

Exemplary Center for Reading Instruction (ECRI) focuses on helping teachers learn strategies to teach word recognition skills, vocabulary, comprehension, study skills, spelling, proofreading, creative and expository writing, penmanship, and literature through direct instruction. The program's goal is to improve elementary and secondary students' abilities to read and communicate effectively.

Teachers learn to use specific, scripted instructional materials that provide them strategies such as eliciting accurate and rapid overt responses from students during instruction; maintaining on-task-behavior; diagnosing student errors; reinforcing correct responses; integrating the language arts; modeling and prompting during instruction; and evaluating toward mastery of skills. It is an instructional approach that focuses on individualized instruction, positive reinforcement, and high expectations for students. ECRI allows teachers to continue using their existing reading and/or content materials, yet helps them become more efficient and effective instructionally. In addition to staff development, ECRI includes curricular materials for students, instructional resource materials, and criterion-referenced mastery tests.

The ECRI program was originally developed in 1972 and received National Diffusion Network certification in 1974, 1985, 1990, and 1996.

Content

- word recognition skills
- vocabulary
- comprehension
- study skills
- spelling
- proofreading
- literature
- creative and expository writing
- penmanship
- informal reading assessment

Context

- rural, suburban, and urban schools
- students of varied ability levels
- high- and low-poverty schools
- both high and low percentages of minority students

Program Context

The ECRI program has been implemented in school and district sites that range from urban to rural and suburban, with remedial, Title I, bilingual, gifted, learning disabled, and regular education students. The districts in which the program is used range from small to large districts with varied student populations. Some districts have predominantly Caucasian students, while others have over 60 percent minority students (predominantly African American and Hispanic).

Staff Development Program

The Exemplary Center for Reading Instruction program provides a five-day training on teaching reading and language skills, using the ECRI instructional approach. Training includes lecture, practice sessions, preparation of materials for classroom use, and teaching students in a simulated setting.

During the training, teachers observe demonstrations and engage in micro-teaching. The training curriculum includes reading strategies, assessment techniques, setting high mastery expectations, giving positive reinforcement, and the ECRI philosophy of reading instruction. Instructional and curriculum materials support the implementation of the new skills in the classroom.

Teachers learn to schedule class time efficiently, track student progress, and select an instructional schedule that fits within the existing time frame for instruction in their schools. They learn to administer informal reading inventories to place students in reading materials at the appropriate instructional level and also how to set high expectations for student performance.

Other training is provided by ECRI trainers in workshops that range from two to five days. In addition to the Basic Reading Seminar, the following seminars are offered: Intermediate Reading; Advanced Reading; Integrating Literature, Comprehension, and Study Skills; Integrating Comprehension, Composition, and Literature; and Secondary Education (content-area reading). Phone support, instructional materials, and site visits are also provided.

Process

- training
- practice
- demonstration
- modeling

Intended Audience

- entire school
- entire department
- entire grade

Summary of Results

Students whose teachers received training in ECRI and used ECRI instructional strategies and materials scored significantly better on reading sub-tests and the total reading battery of standardized achievement tests. These results hold across various ability groups and in a wide variety of educational settings.

Evidence of Increased Student Achievement

Success Indicators

- norm-referenced reading assessments

Program effectiveness was demonstrated with (1) comparison group students receiving their regular reading instruction and (2) expectancies derived from national normative data. Results are reported for several sub-populations of students (4,000 total) in multiple district (200 schools) and school contexts ranging from rural to urban. The increase in achievement has been consistent for all studies (1974, 1985, 1990, and 1996). Gifted, regular education, special needs, and special education students performed significantly better ($p<.005$) on the reading subscales and total reading composite scores on standardized achievement tests than (1) comparison group students receiving their regular reading instruction and (2) expectancies derived from national normative data. For example, in 1996, 1,099 students in grades 7-10 in Lamar County, Alabama, demonstrated three years of statistically significant growth ($p<.01$) on the comprehension section of the Stanford Achievement Test. Students tested over a one-year period had a median gain of 9.5 NCEs. Students tested over two years demonstrated a median gain of 8.1 NCEs. Students tested over three years demonstrated a 7.85 median gain.

Results were consistent in three diverse sites for grades 5-8. Regular education students in grades 5-8 gained between 4.13 and 12.15 NCE with a statistically significant difference of $p<.01$. Special needs students in grades 5-7 gained between 6.41 and 19.78 NCEs with a statistical significance of $p<.05$. Special education students in grades 5-8 gained between 7.30 and 23.93 with a statistical significance of $p<.05$.

THE BOTTOM LINE

The Exemplary Center for Reading Instruction (ECRI) program combines intensive skills training and scripted instructional materials to improve students' reading skills and language skills. Data indicate that ECRI works with students of all ability levels in a wide variety of school contexts. Many of the implementation sites are in low socio-economic or poor-performing schools. Results are also shown with special education, Title I, bilingual, and gifted students. ECRI is best implemented with other language arts staff development programs to provide a comprehensive language arts course of study.

Sample Sites

✓ Weldon City Schools
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web site: unavailable

✓ Darby Junior High School
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✓ Reid School
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Documentation

Reid, E. (1996). *Program Evaluation Panel Report*. Salt Lake City: Exemplary Center for Reading Instruction.

National Writing Project

Language Arts

Content

- writing process
- instructional strategies in writing
- integration of and application of writing processes in other content areas
- professional development programs
- teacher leadership

Program Description

The National Writing Project is a national network that focuses on student writing skills by improving the teaching of writing in the nation's schools. The program began in 1974 at the University of California, Berkeley, with the creation of the Bay Area Writing Project. Since then, the project has expanded to 160 sites in 46 states and Puerto Rico.

The goals of the National Writing Project are to improve the teaching of writing, professional development programs for teachers, and the professional standing of classroom teachers. Writing project sites are typically collaborations between universities and school districts.

The Writing Project Model is based on a "turn-around" model of training and support. Exemplary teachers are recruited to participate in multi-week intensive summer institutes that focus on the study and teaching of writing. At the institutes, teachers prepare to lead professional development programs during the school year with their colleagues.

Sites tailor the Writing Project Model to meet the needs of teachers and students at a local level. For example, the University of California at Irvine Writing Project, in collaboration with the Santa Ana Unified School District, developed a program to address the needs of second language learners.

Context

- wide range of states, districts, and schools
- diverse student populations

Program Context

The National Writing Project is currently operational in 46 states and Puerto Rico. Programs are offered in urban areas, suburban areas, rural, and mixed settings. Students of teachers who have participated in the National Writing Project vary dramatically by demographic and ability characteristics. The National Writing Project supports networks for teacher leaders in urban and rural schools, and in schools and districts with student populations that have a high number of ESL students or students living in poverty. Sites exist in Greece, other European countries, and Canada.

Staff Development Program

The National Writing Project's basic program is a five-week summer intensive institute for teacher leaders. It focuses on examining how they teach writing; strategies for using writing as a tool for learning in all content areas; understanding the writing process by becoming writers themselves; studying the theoretical foundation of writing instruction and the research related to teaching writing; and preparing to become staff developers of their colleagues.

Institutes are most often held at a college or university and planned collaboratively by the university faculty and local school district teachers. The strength of the National Writing Project's staff development program is its preparation of teacher leaders to become providers of staff development. In addition to credible teachers, the staff development program is successful because it can be tailored to meet the needs of specific schools or districts.

Process

- training
- summer institutes
- demonstration
- on-site support
- teachers as writers

The National Writing Project provides a variety of other services and support to schools and teachers. In addition to the summer institutes and ongoing training and support throughout the school year, NWP offers open-enrollment summer institutes, teacher research groups, assessment workshops, emergent literacy programs, writing across the curriculum programs, support for new teachers, publications, national networking, retreats for teacher leaders, on-site support, and parent workshops.

Intended Audience

- individual volunteer teachers
- entire department, team, or grade
- entire school

Each of the 160 sites is evaluated annually by the National Writing Project to maintain quality of the institute and follow-up training and support.

Summary of Results

The National Writing Project is a teacher-driven professional development program that strengthens teachers' skills and understanding of teaching writing. It has been successful in improving student performance in local- and state-level assessments of writing.

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Evidence of Increased Student Achievement

Success Indicators

- writing samples
- state- and district-level
- teacher attitudes about writing

Studies showing the National Writing Project's impact on student performance and behavior are numerous. Often using a controlled comparison method, studies have demonstrated that the National Writing Project leads to increases in student achievement.

Similar studies in California and Maryland demonstrate that students of teachers who participated in writing project professional development performed significantly better on post-tests of writing than did students of teachers who did not participate in writing project professional development. The University of California, Irvine, Writing Project evaluation results demonstrated a difference of .612 in favor of the experimental group ($p < .03$).

In an evaluation of the Chicago Area Writing Project, scores of those students in grades 3, 6, and 8 whose teachers received 30 hours of National Writing Project professional development posted a statistically significant one-year gain when compared to gains in scores city-wide.

In addition to measures of increased student achievement, evidence exists that the National Writing Project alters teachers' classroom practices and attitudes about writing.

THE BOTTOM LINE

The National Writing Project provides efficient and effective staff development to teachers who wish to improve their students' performance in writing. As a long-standing program with rigorous, ongoing evaluation, the National Writing Project is a model of teacher-driven, focused staff development that can be altered to accommodate the specific needs of schools and districts.

Sample Sites

Note: Several specific sites, rather than individual schools, are listed here. For a complete list of all sites, check the NWP Website.

✓ Bay Area Writing Project
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✓ UCLA Writing Project
Jane Hancock
UCLA Center X
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Los Angeles, CA 90095-1521
phone: 310-825-9495
fax: 310-206-5369
e-mail: hancock@gseif.ucla.edu
web site: unavailable

✓ New York City Writing Project
Lehman College
City University of New York
250 Begford Park Boulevard
Bronx, NY 10468
phone: 718-960-8758
fax: 718-960-8054
e-mail: unavailalbe
web site: unavailable

✓ Northern Virginia Writing Project
Mark Farrington
George Mason University
Mail Stop 3E4
Fairfax, VA 22030
phone: 703-993-1168
fax: 703-993-1184
e-mail: mfarring@osfl.gmu.edu
web site: unavailable

✓ Mississippi State University Writing/Thinking Project
Mississippi State University
7 Station, Box 10021
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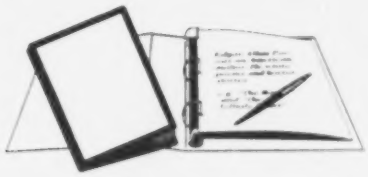
Web site: www-gse.berkeley.edu/nwp

Documentation

Eidman-Aadahl, E. (1990). *Summary Report: The Evaluation of the Write to Learn Program, Second Year.* Baltimore, MD: Abell Foundation.

Olson, C. (1997). *Using Thinking/Writing Model to Enhance Reading, Thinking, and Writing about Literature: An Experimental Treatment Study of the Impact of the Thinking/Writing Model on Staff Development and Student Writing Ability.* Irvine, CA: University of California, Irvine Writing Project.

Stokes, L. (1992). *National Writing Project: Summary of Program Evaluations 1991-92.* Inverness, CA: Inverness Research Associates.



Profile Approach to Writing

Program Description

Content

- writing evaluation
- traits of quality writing
- responding to student writing
- use of the Composition Profile

The Profile Approach to Writing program (PAW) provides a system for accurately assessing student writing and for giving meaningful feedback. The goals are: to increase objectivity and reliability of readers/evaluators of student writing; to reduce grading/evaluation time; to promote growth in writing through the identification of writing strengths and weaknesses, using positive, constructive teacher feedback, peer evaluation, and student self-monitoring; and to measure student writing performance. The National Diffusion Network recognized PAW from 1986-1995 for inclusion in *Educational Programs That Work*.

Profile Approach to Writing was developed from 1976-86 by four university composition instructors. It treats evaluation of writing as an integral part of the writing process and acknowledges that, when students have more opportunities to write and receive meaningful, systematic feedback, their writing performance improves. The core element of the program is the Composition Profile, a holistic/analytic evaluation instrument that contains five components of writing: content, organization, vocabulary, language use, and mechanics. The Profile can be used by teachers in all disciplines and allows schools to have consistent standards to assess student writing performance.

Program Context

Context

- diverse student populations including large populations of minority and low-income students
- diverse school settings including rural, urban, and suburban schools

The PAW program has been widely implemented. Participating schools include seven districts in Texas; three districts in Oklahoma; one district in Missouri; and St. Joseph's Indian School in South Dakota. Other participants are schools in California, Louisiana, Kentucky, Wyoming, Arkansas, and Connecticut. Demographics in each district vary extensively in terms of minority populations, socio-economic levels of students, and college attendance levels. Regional areas also differ. The exception is that St. Joseph's Indian School has a student population that is 100 percent Native American who all receive free- or reduced-lunches.

Staff Development Program

Staff development includes training, modeling, and ongoing support. Emphasis is placed on assessing student writing accurately and reliably and on providing meaningful feedback to students. Training and follow-up support are provided by the program developers or certified trainers. The training is supplemented with curriculum materials and a training manual for teachers.

Training is offered in units varying from 6-30 hours. Workshops are tailored to meet the specific needs of the audience, and are aligned with the objectives of the site and teachers' prior knowledge about writing evaluation. The scope of the training ranges from raising teachers' awareness of the writing process to learning how effective feedback and evaluation assist in writing develop-ment to create successful, independent writers.

Topics of the staff development include: (1) audience/purpose and developing and organizing content; (2) effective feedback, grading, testing and diagnosis; (3) growth effects from positive feedback; (4) in-depth revision techniques and activities that correlate with teacher feedback; (5) methods that encourage students to analyze and strengthen their own writing; (6) topic development through analysis of writing techniques; and (7) ways to use large and small groups and individualized conferencing in the classroom.

Each training is approximately 15 percent theory and 85 percent hands-on activities. Teachers develop materials and activities that can be incorporated into their existing curriculum. All PAW trainers are certified and have undergone extensive training and use of the PAW materials in their own classrooms.

Process

- training
- modeling
- hands-on practice
- developing instructional materials

Intended Audience

- entire school
- entire department or team
- individual volunteer teachers

Summary of Results

Profile Approach to Writing has improved student writing performance on a number of measures of writing. PAW assists both students and teachers in learning to develop their own writing skills. In addition to improving their writing performance, PAW has positively influenced students' attitudes about writing and their creative thinking.

Evidence of Increased Student Achievement

Researchers used a number of assessments and a quasi-experimental research design to compare students' writing performance before and after PAW intervention and to compare PAW students' improvement with the performance of other students on statewide measures. Statewide assessments of writing included the Texas Assessment of Academic Skills (TAAS) (4 point scoring rubric), the Oklahoma Stanford Writing Test (12 point scoring rubric), and The Profile Approach to Writing (100 point scoring rubric) to assess student-writing performance in multiple states, districts, and schools. Each student writing sample was read by a minimum of two readers, and scoring discrepancies were resolved by a third reader. Inter-rater reliability for all assessments exceeded .85.

Success Indicators

- writing samples
- the Profile Approach to Writing
- state writing assessments
- Torrance Test of Creativity
- Daly-Miller Apprehension Test

Statistical analysis included ANOVA and paired and independent t-tests. Students participating in the PAW program had statistically significant ($p<.01$) gains in the short term after one year and in the long term. Effect sizes for various middle school populations ranged from 1.15 (large effect size) to 2.34 (large effect size).

Additional assessments indicate improvement in students' verbal creativity (Torrance Test of Verbal Creativity) as well as in writing performance and maintenance of a positive attitude about writing (Daly-Miller Apprehension Test and Student Questionnaire). In schools using the Profile Approach to Writing, student performance in writing and attitude about writing increased significantly ($p<.01$) over diverse populations and school and district settings when compared to performance of similar student groups. The results were consistent from grades 3-11 and sustained over a three-year period.

THE BOTTOM LINE

The Profile Approach to Writing provides teachers with the tools and skills to respond constructively to student writing and to reduce the time spent grading student writing. At the same time it increases students' opportunities to write and their performance in writing.

Sample Sites

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✓ Putnam City Schools
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Web site: unavailable

Documentation

Profile Approach to Writing. (1995). Self-study submitted to Program Effectiveness Panel at the National Diffusion Network. College Station, TX: Author.

Project Success Enrichment

Language Arts

Content

- writing process
- literature study
- critical and creative thinking skills
- reading strategies
- linking integrated language arts with visual arts
- instructional strategies

Context

- varied school sites including rural, urban, suburban, and Native American schools
- diverse student populations including:
  - ESL
  - LEP
  - Title I
  - special needs
  - gifted
  - regular education

Program Description

Project Success Enrichment is designed to enrich students' language arts and visual arts literacy as well as their creative, critical, social, and self-management skills. The interdisciplinary program focuses on a process approach to writing to integrate literature, higher-order thinking skills, the multiple intelligences, and other disciplines.

Through the staff development component of the program, teachers learn to incorporate cooperative learning, hands-on activities, problem solving, demonstrations, questioning strategies, and critical and creative thinking processes into the classroom. Teachers are helped to accommodate a variety of learning styles and the needs of various levels of learners by adjusting curriculum and student projects to address differences among their students.

A strong staff development program supports both the implementation of the program and change in teacher instructional practices. Teachers acquire knowledge and skills to: integrate questions; enhance students' creativity and critical thinking skills; integrate writing and thinking in a structured, organized way; and connect writing and thinking to reading, literature, the visual arts (drawing, painting, claywork), and other disciplines. Project Success Enrichment can replace or enhance the regular language arts curri-culum. It was recognized by the National Diffusion Network in 1983 and 1989 and revalidated in 1996.

Program Context

Project Success Enrichment is currently implemented in 2,500 schools in 40 states. The program was originally developed for gifted and talented students but now meets the needs of all students including regular education, Title I, at-risk, special needs, Limited English Proficient. It includes students who have a variety of cultural backgrounds and those who come from various settings (rural, large city urban, suburban, and small cities).

Staff Development Program

The staff development program required to implement Project Success Enrichment includes a basic two- to four-day training and follow-up sessions (inservice, classroom observations, and coaching sessions). An on-site coordinator provides follow-up support with phone, e-mail, and other assistance provided by the Project Success Enrichment certified trainer and program developer.

Process

- training
- demonstrations
- modeling
- curriculum development
- on-site support

The training focuses on using the multiple-modality approach to teaching the language arts and visual arts curricula. It specifically stresses how to accommodate differences in students' academic and cognitive ability. The introduc-tory training is designed to familiarize teachers with the instructional strategies needed to implement the program and the language arts curriculum. These strategies include word expansion, sentence expansion, imagery, drafting, and revision skills. Teachers learn to engage students in writing descriptions, poetry, fantasies, and adventures. The language arts curriculum can be presented individually along with the visual arts or in an integrated fashion.

More advanced levels of training focus on pedagogical techniques for implementing more complex elements of the language arts curriculum such as liter-ary analysis and symbolism. Other training available to supplement the program implementation includes three levels of training on visual arts and three levels of training on integrating language arts through the curriculum.

Intended Audience

- entire department or team
- entire school

Teachers receive extensive support materials including sample instructional materials, student writing samples to use with their students, sample curriculum units, and guidance in developing further units of study.

Summary of Results

Project Success Enrichment increases students' skills in writing and critical and creative thinking through a process approach to writing and the integration of literature and visual arts. Teachers acquire constructivist instructional strategies and techniques for accommodating the diverse needs of learners in their classrooms.

Evidence of Increased Student Achievement

Success Indicators

- student writing portfolios
- student visual arts portfolios

Multiple evaluations of Project Success Enrichment over 15 years have demonstrated its positive impact on student performance. Pre- and post-test portfolios collected and evaluated by experts demonstrated student growth in both writing and visual arts. Portfolios incorporated both writing and visual arts and included classroom-based samples of students' writing in multiple genre including short stories, poems, descriptions, and character descriptions.

Evidence of student achievement has been demonstrated on multiple measures of reading and writing. In a 1983 experimental study, 469 fourth-, fifth-, and sixth-grade students at 17 sites in five states demonstrated statistically significant ($p<.008$) growth in creative writing skills. The characteristics used to assess creative writing were descriptive language, imagery, and overall quality of writing.

In a 1996 study third- to seventh-grade students at 37 sites in 16 states who participated in Project Success Enrichment scored significantly better on a creative writing assessment than students in a comparison group who did not participate in the program ($p<.05$-$.000$).

Program participants are encouraged to conduct pre- and post-test assessments to measure continuous improvement of student work.

THE BOTTOM LINE

Project Success Enrichment incorporates a process approach to writing with the study of literature and visual arts to enhance students' writing and critical and creative thinking skills. The program combines curriculum and instructional materials that can be used independently or integrated within the regular language arts curriculum. The program has flexibility to accommodate the academic and cognitive needs of a wide range of student learners.

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Language Arts

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The Creative Connection. (1996). *Revalidation Submittal for the Program Effectiveness Panel.* Seattle, WA: Author.

Maker, C.J., Rogers, A., Nielson, A.B. & Bauerle, P.R. (1996). Multiple intelligences, problem solving, and diversity in the general classroom. *Journal for the Education of the Gifted, 19(4),* 437-460.

Project Success Enrichment (PSE). (1996). *Educational Programs That Work: The Catalogue of the National Diffusion Network,* 21st edition. Longmont, CO: Sopris West.

Six Trait +1 Analytic Model for Writing Assessment

Program Description

The Six Trait + 1 Analytic Model for Writing Assessment offers teachers more useful writing assessment tools to help students as they revised their written work. Its goals are to help teachers become more confident and competent assessors of student writing, to help them use their knowledge of good writing to help students develop their writing skills, to help teachers use models of strong and weak writing as instructional tools to develop students' writing skills, and to assist students in becoming more critical of their own writing so they can revise their work more successfully.

The program is built on three premises. First, teachers and students must learn how to assess writing. Second, students use models of strong and weak writing to assist them in producing their own good writing. And, third, students think and work more like professional writers as they consistently and accurately apply the language of the 6 + 1 traits.

The use of specific traits to teach and assess writing is the focus of Six Trait + 1 Analytic Model for Writing Assessment. Ideas, organization, voice, word choice, sentence fluency, conventions, and presentation are used as the key concepts to help teachers and students develop writing skills. In large-scale assessments of student writing, when teachers score student writing by systematically analyzing and rating it, they learn a great deal about student writing. The developers of Six Trait + 1 demonstrate that students write better when they learn how to use criteria of quality writing that is developmentally appropriate to rate their own writing.

Content

- student writing assessment traits:
  - ideas
  - organization
  - voice
  - word choice
  - sentence fluency
  - conventions
  - presentation
- models of good writing
- instructional strategies and materials to teach the traits

Context

- diverse student populations including large populations of minority and low-income students
- diverse school settings including rural, urban, and suburban schools

Program Context

Six Trait + 1 Writing is being used throughout the country in urban, suburban, and rural districts. Many of the districts using Six Trait + 1 Writing have very diverse student populations. The program is also used in France, China, Saudi Arabia, Australia, and England, and it is still expanding.

Staff Development Program

Training in the six-trait scoring process requires two days. Participants learn the definitions of each of the six traits, have opportunities to practice assessing student writing for each of the six traits, receive instruction in how to teach the traits to students, and develop plans for "mini-lessons" for each trait. Training is supported by an array of instructional enhancement tools including videos and teacher manuals. The manuals include scoring guides written for teachers and for students at each grade level.

In addition, classroom activities designed to help students develop skills in each trait are provided. Teachers receive sample student essays to share and discuss with their students, as well as strategies for teaching students how to assess their own writing using the six-trait assessment model. *A Writing Teacher's Action Handbook* is designed to enhance the writing of students in grades 3 and beyond. It guides teachers in scoring writing, developing writing assessments, and developing student writing skills. *Six-Trait Focus Lessons* contains model lessons for teaching the skills associated with quality writing. The lessons help teachers use student writing as a tool for teaching about revising for excellence.

A Training of Trainers Program is also available to allow schools and districts to implement the program at limited expense. In addition, three and one-half day Creative Writing Institutes are held across the country to provide intensive training. Follow-up assistance is also available for teachers through visitations, electronic means, and telephone contacts.

Process

- training
- modeling
- practice opportunities
- lesson designing
- resource materials
- videotapes

Intended Audience

- individual teachers
- entire departments
- entire school

Summary of Results

When students receive instruction in the traits of good writing and examples of how these traits appear in both good and poor writing, their writing skills improve. In one assessment, fifth-graders' achievement in the first trait, *ideas*, was significantly higher than those in the treatment group, indicating that teachers' learning and direct instruction in this trait positively contributed to student performance.

Evidence of Increased Student Achievement

Success Indicators

- writing assessment

The writing of students who had direct instruction on assessing writing using the six-trait analytical model improved more than the writing of students who did not have such instruction. Six classrooms of fifth-graders were recruited to participate in the study and were randomly assigned to either the treatment or control groups. Classrooms were in different schools and districts and were selected to represent different educational contexts (rural, suburban, urban, size of school, size of district, expenditures).

Two writing assessments were collected from both treatment and control students. One assessment prompt was expository and the other narrative. One prompt was randomly distributed at the pre-test, and the other one was used at the post-test. Scoring was done by experienced raters and controlled for impact. Matched pre- and post-test scores were examined using analysis of variance.

Pre-test scores of the treatment and control groups were very similaron all six traits. Post-test scores were significantly different for the trait of *ideas*—the trait given the most emphasis in the staff development program and in classroom instruction. The traits of *organization* and *voice* tended toward significance. The differences between the treatment and control groups for other traits, which were not directly taught in the treatment group, were not significant. Evaluators conclude that the results lend credibility to the premise that student writing improves to the extent that instruction addresses the features of writing deemed most important, and that instruction includes analysis of how these traits are exemplified in good and poor writing.

THE BOTTOM LINE

Six Trait + 1 Writing Assessment is an inexpensive and easily implemented program that can make a difference in student performance. It provides teachers and students with common criteria for success, which makes positive results more likely. While the research study is limited, the program has promise of helping both teachers' and students' achievement in writing.

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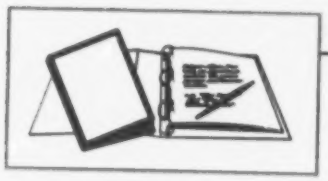
DOCUMENTATION

Arter, J., Spandel, V., Culham, R. & Pollard, J. (1994). *The Impact of Training Students to Be Self-Assessors of Writing.* Paper presented at AERA, New Orleans.

Spandel, V. (1996, January). Criteria: The power behind revision. *Writing Teacher,* 9-12.



Standards for Language Arts

National Council of Teachers of English
International Reading Association, 1995

1. Students read from a wide range of print and non-print texts including fiction, nonfiction, classic and contemporary to build understanding, acquire information, respond to society and the workplace and fulfill personal needs.

2. Students read a wide range of literature from many periods in many genres to understand the many dimensions of human experience.

3. Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts.

4. Students adjust their use of spoken, written, and visual language to communicate effectively with a variety of audiences and for different purposes.

5. Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences and for different purposes.

6. Students apply knowledge of language structure, language conventions, media techniques, figurative language, and genre to create, critique, and discuss print and non-print texts.

7. Students conduct research by generating ideas and questions and posing problems; students gather, evaluate, and synthesize data from a variety of sources to communicate their discoveries in ways that suit their purpose and audience.

8. Students use a variety of technological and informational resources (e.g. libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.

9. Students develop an understanding of and respect for diversity in language use, patterns, and dialects from across cultures, ethnic groups, geographic regions, and social roles.

10. Students whose first language is not English make use of their language to develop competency in the English language arts and to develop understanding of content across the curriculum.

11. Students participate as knowledgeable, reflective, creative, and critical members of a variety of literary communities.

12. Students use spoken, written, and visual language to accomplish their own purposes (e.g. for learning, enjoyment, persuasion, and the exchange of information).

Table 2: Standards for Language Arts

Ideal programs promote or develop the following standards:	Junior Great Books	Student Team Literature	ECRI	National Writing Project	Profile Approach to Writing*	Project Success Enrichment	6 + 1 Traits
• Students read from a wide range of print and nonprint texts including fiction, nonfiction, classic and contemporary to build understanding, acquire information, respond to society and workplace and fulfill personal needs.	X	X	X	X	❊	X	X
• Students read a wide range of literature from many periods in many genres to understand the many dimensions of human experience.	X	X	X	X	❊	X	
• Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts.	X	X	X	X	X	X	X
• Students adjust their use of spoken, written, and visual language to communicate effectively with a variety of audiences and for different purposes.	X	X	X	X	X	X	X
• Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences and for different purposes.	X	X	X	X	X	X	X
• Students apply knowledge of language structure, language conventions, media techniques, figurative language, and genre to create, critique, and discuss print and nonprint texts.	X	X	X	X	X	X	X

Table 2: Standards for Language Arts

Ideal programs promote or develop the following standards:

	Junior Great Books	Student Team Literature	ECRI	National Writing Project	Profile Approach to Writing⁂	Project Success Enrichment	6 + 1 Traits
• Students conduct research by generating ideas and questions and posing problems; students gather, evaluate, and synthesize data from a variety of sources to communicate their discoveries in ways thatsuit their purpose and audience.	x	x	x	x	x	x	x
• Students use a variety of technological and informational resources (e.g. libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.		x	x	x	x		x
• Students develop an understanding of and respect for diversity in language use, patterns, and dialects across cultures, ethnic groups, geographic regions, and social roles.		x	x	x	⁂	x	x
• Students whose first language is not English make use of their language to develop competency in the English language arts and to develop understanding of content across the curriculum.			x	x	x	x	x
• Students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities.		x	x	x	x	x	x
• Students use spoken, written, and visual language to accomplish their own purposes (e.g. for learning, enjoyment, persuasion, and the exchange of information).		x	x	x	x	x	x

⁂ This trait is encouraged but not specifically addressed.

MATHEMATICS PROGRAMS

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Introducing Math Teachers to Inquiry 78

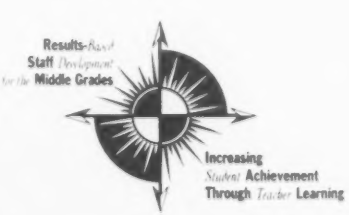
Math Renaissance 82

Peoria Urban Mathematics Plan . .86

Powerful Connections 90

Rice University School Mathematics Project 94

University of Illinois at Chicago — All Learn Mathematics 98



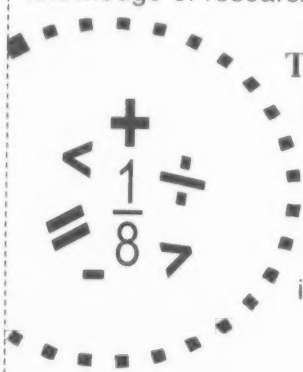
Overview
Mathematics Staff Development Programs

Jane Swafford, National Advisory Panel, National Council of Teachers of Mathematics

Seven professional development programs that demonstrate improved student achievement and have a content focus on mathematics are included in this guide. Although these seven programs vary in their organization and delivery methods, a number of common threads run through most of these results-based programs.

Each of the programs focuses on changing teachers' pedagogical practice to include more reform practices. They do so by engaging teachers as learners using those practices, or by providing or developing student materials that call for different teaching techniques. To encourage actual change in practice, each program provides some sort of follow-up activities and ongoing classroom support. For some programs, support is provided by a teacher leader/colleague or by a professional network group. In others, support is provided by someone outside of the school, often the professional development provider. In connection with the ongoing support, the program encourages reflection on practice and collaboration with other teachers who were also engaged in examining their practice.

Most of the projects also share a focus on the mathematics curriculum or materials to be used with students. Some have teachers develop units for use with their students, while others have teachers study replacement units or new materials that are to be implemented. A hallmark of these professional development programs that show student-achievement results in mathematics is a focus on helping teachers prepare or use mathematics content materials and on developing appropriate teaching methods to use with those materials. To help teachers use a wider range of pedagogical practices, some projects enhance teachers' knowledge of research on how students learn mathematics.



The results-based mathematics programs included here are, for the most part, systemic efforts. That is, the programs focused on impacting whole schools or districts rather than individual teachers in scattered schools. Most of the programs lasted at least a year with some sort of intense workshop or course, usually during the summer, followed by support activities during the academic year.

Staff Development Program

A required two-week, 45-hour professional development institute is taught by certified Hawaii Algebra Learning Project staff. It gives a new look at both algebra content and instruction. Teachers learn the problem-solving processes of reversibility, flexibility, and generalization; ways to develop these processes through non-routine tasks; the use of computers, calculators, and manipulatives in teaching algebra; collaborative and cooperative group techniques; and how to incorporate writing into algebra class.

Participants in the institute experience algebra as their students will by using the student text as the basis of the algebraic content, while at the same time expanding their content knowledge with open-ended tasks. Participants also engage in interview tasks to explore problem-solving development and discuss how to create the learning environment necessary to help students acclimate to their new roles. Additionally, teachers learn to construct questions that promote higher-order thinking and problem-solving processes, facilitate discussions, change classroom management techniques to accommodate a student-centered environment, and assess students using new techniques.

Each school is encouraged to plan for follow-up support that will best meet the school's and teachers' needs. Follow-up support *can* include: users' meetings in the school or district; visits by instructor and/or project team members for classroom coaching or demonstration teaching and debriefings; release time to observe other teachers' classes; electronic bulletin board and e-mail; newsletters; and phone calls to individual users and the developers.

Process

- training
- demonstration lessons
- coaching
- debriefing
- electronic support
- newsletters

Intended Audience

- entire school
- entire department or team

Mathematics

Summary of Results

At all sites, large gains beyond expectation were found. All pre/post-percentile scores were statistically significant at the $p<0.001$ level. Even though there were large differences in pre-test means at the three sites, the gains shown at each site were very similar in magnitude, indicating a significant value-added component. Percentile gains ranged from 15 to 21 points.

Evidence of Increased Student Achievement

In 1995-96, the Curriculum, Research, and Development Group conducted an evaluation (Young et al., 1998) using a pre-test, post-test, norm-referenced design. The Harcourt-Brace *GOALS: A Performance-Based Measure of Achievement* was used because the items cover topics beyond first-year algebra, including geometry, probability, and statistics. The test's open-ended format matched the format of HALP's classroom instruction. *GOALS* emphasizes justification and explanation for answers, so students can demonstrate their thinking and reasoning. Although not a true control group, the national norming group provided an acceptable comparison group for statistical analysis.

Success Indicators

- norm-referenced assessment

The tests were administered in fall 1995 and spring 1996 to HALP students at three sites. Two sites were in Mississippi, and one was in Hawaii. The sites represent a wide diversity of socio-economic and achievement levels.

To ensure that all students had adequate opportunity to learn, each site was examined. The teachers involved had all successfully completed the required 45-hour institute. All teachers were either directly observed or videotaped during the year to assure that the quality of instruction was aligned with the goals of the program, that teachers covered the expected amount of course material and concepts, and that they used a variety of instructional strategies consistent with the program and designed to meet student learning needs.

To compare the scores, the means of the raw scores were converted to their corresponding scaled scores. These scaled scores each corresponded to a percentile whose value depended on whether the test was administered in the fall or the spring. Students who participated in HALP performed significantly better than the comparison group.

THE BOTTOM LINE

The Hawaii Algebra Learning Project is a combined curriculum and staff development effort. The use of the teacher resources, student texts, and assessments, coupled with the intensive staff development program, have led to significant improvement in student achievement in mathematics with students of diverse backgrounds.

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Mathematics

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Documentation

Young, D.B., Dougherty, B., Lai, M.K. & Matsumoto, A. (1998). Addressing equity through curriculum development and program evaluation. *Journal of Women and Minorities in Science and Engineering, 4*, 269-281.

Introducing Math Teachers to Inquiry

Mathematics

Content

- inquiry-based instructional strategies
- mathematics reform
- mathematics content

Context

- diverse student populations including special needs students
- diverse school settings including urban and sub-urban schools
- diverse teacher populations

Program Description

Introducing Math Teachers to Inquiry is a year-long professional development program implemented in three cycles. It began as a National Science Foundation (NSF) Teacher Enhancement Program and subsequently became the introductory component of a Local Systemic Change (LSC) initiative also funded by the NSF. The program's goals are to improve school-wide mathematics instruction and students' learning through an inquiry approach to instruction and to develop a better understanding of what it means and what it takes to achieve pervasive, long-lasting changes in middle school mathematics. The LSC program is a partnership among four districts in the greater-Rochester area, the University of Rochester and Roberts Wesleyan College.

The professional development processes that led to the results of this program are: (1) the use of "illustrative units" that modeled how mathematics instruction and curriculum should look; (2) engaging teachers in experiences as learners through inquiry; (3) engaging in and sharing reflections about teaching and learning; (3) developing support within the same school to increase teacher collaboration with colleagues; and (4) engaging heterogeneous participants (special education teachers, secondary certified teachers, those teaching mathematics without certification in the field, pre-service teachers, and administrators) in the same professional development experience.

Program Context

Introducing Math Teachers to Inquiry was implemented in four schools in four districts in the greater-Rochester area in conjunction with two local institutes of higher education. Each district and school has participated in both the teacher enhancement program and the current local systemic change initiative developed by the researchers. The schools have a strong interest in and desire to improve mathematics instruction.

Staff Development Program

Introducing Math Teachers to Inquiry is a year-long staff development program consisting of a week-long intensive summer institute followed by supported field experiences and follow-up meetings during the school year. The program introduces teachers to the vision of mathematics articulated in the standard of the National Council of Teachers of Mathematics (NCTM). It also helps teachers: gain a personal understanding of what it means to teach mathematics through inquiry; begin to implement this type of teaching in their classrooms; and recognize the need for further professional development and school reform.

The summer institute engages teachers in the experience of inquiry-based instruction as learners. Teachers gain the skills and necessary materials to implement one of the illustrative units using inquiry-based instructional strategies. Teachers learn to actively engage students in the construction of mathematical knowledge, develop units for implementing the processes in their classrooms, and implement the instructional processes in their classrooms with the support of the institute facilitators and a school-based team made up of other participating teachers. They also read, discuss, and reflect about mathematics and mathematics teaching and learning, using contemporary perspectives.

During the school year, teachers adapt and implement one of the illustrative units in at least one class at the beginning of the school year and an additional unit at some point later in the school year. Teachers meet regularly with a support team to discuss their experience with the units. Follow-up involves sharing field experiences with colleagues, attending sessions to address common issues and concerns raised during field experiences, and planning new units.

Process

- training
- modeling
- demonstrations
- curriculum development
- classroom observations
- coaching
- reflection
- collegial interaction

Intended Audience

- entire department or team
- individual volunteer teachers

Summary of Results

Introducing Math Teachers to Inquiry changes teachers' classroom practices, engages students in inquiry-based learning, and improves student achievement on classroom-based performance assessments. Further analysis of the impact of the program will determine with greater certainty what effect the program will have on student achievement.

Evidence of Increased Student Achievement

Evidence of student success in this project is a measure of student performance on classroom-based performance assessments that demonstrate students' understanding and application of mathematics concepts related to the specific units teacher designed and implemented. Because teachers selected the content of the units they designed and implemented, standardization of student achievement measures was not possible.

Success Indicators

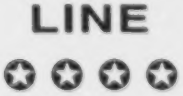
- classroom-based performance assessments
- individual student performance
- teacher journals
- teacher observations
- teacher surveys

Evidence of the impact on student learning is drawn from case studies of two eighth-grade classes. The data from one class are based on students' test results at the completion of a unit on the topic *area*. In this class, after 11 days of instruction, the mean results of the 23 students was 44.26 of 50 or 88 percent. This score was considerably higher by approximately 10-15 percentage points than any previous unit tests these students had taken. The three learning-disabled students in the class scored first, second, and fourth.

The other case study was based on students' involvement in a 31-day Tessellations Unit. A majority of students were successful in most of the subgoals of the unit. Classroom assessment measures included a variety of approaches to assessing students' problem-solving such as: using a problem-solving heuristic; solving teacher-posed problems; posing their own problems; and a long-term group inquiry project involving a presentation.

This type of evidence makes it difficult to conclude that the program leads to increased student achievement. But, the case studies, classroom observations, teacher journals and surveys demonstrate that students' success with difficult mathematics concepts is associated with inquiry-based instruction.

THE BOTTOM LINE



Introducing Math Teachers to Inquiry provides a unique staff development design that guides teachers through changes in classroom practice that encourage the use of inquiry-based instruction. Model units allow instructors to redesign lesson plans to incorporate any content. The program provides classroom-based collegial support. While the data to support increased student achievement are not strong for this project, the potential for a measurable impact exists.

Sample Sites

✓ Merton Williams Middle School
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✓ Ada Cosgrove Middle School
Deb Morley
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fax: 716-352-6130
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✓ Twelve Corners Middle School
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Mathematics

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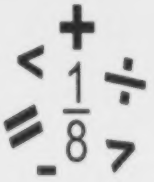
Documentation

Borasi, R. (1992). *Learning Mathematics Through Inquiry*. Portsmouth, NH: Heinemann.

Borasi, R. & Fonzi, J. (under review). *Introducing Math Teachers to Inquiry: Framework and Supporting Materials to Design Professional Development.*

Borasi, R., Fonzi, J. & Smith, F.F. (in press). Beginning the process of rethinking mathematics instruction: A professional development program. *Journal of Mathematics Teacher Education.*



Middle Grade Mathematics Renaissance

Mathematics

Content

- reform mathematics
- instructional strategies
- teacher leadership
- coaching
- replacement units
- debriefing sessions
- sustained time for professional development
- high quality instructional materials

Context

- diverse school settings including urban, rural, and suburban schools
- diverse student populations including high-minority and low-income populations

Program Description

The goal of the Middle Grade Mathematics Renaissance is to help schools transform their mathematics programs so that all students — especially those from groups whose mathematics achievement has historically lagged — become empowered mathematically. During its five years as a component of California's State Systemic Initiative, more than 500 schools, including 2,500 math teachers, participated in intensive, school-based, professional development. This represents nearly 50 percent of the state's middle schools. Thirty-eight percent of schools in the Renaissance were involved for three or more years. Statewide, 74 percent of Renaissance districts had 100 percent of their middle schools participating. The Mathematics Renaissance program has now expanded to work with teams of schools in a vertical slice K-12.

Professional development is the cornerstone of the program and includes content, pedagogy, use of instructional materials, and leadership development consistent with the 1992 California Mathematics Framework and the National Council of Teachers of Mathematics (1989) Standards. Through in-depth and long-term work, teachers discuss mathematics reform, experience hands-on mathematics, learn how to teach new curriculum "replacement" units, and explore the conditions that create opportunities for learning.

The focus of the work is at the school level rather than at the level of the individual teacher. Renaissance staff believe that, by working with the school as the unit of change, a process will emerge that sustains reform efforts beyond the life of the program.

Program Context

Mathematics Renaissance schools represent a broad range of school contexts. Some schools have large minority and economically disadvantaged student populations while others have fewer minority students.

Staff Development Program

Mathematics Renaissance provides both statewide and local leadership. Ten full-time regional directors coordinate the unique projects in their individual regions. Each regional director is responsible for seven "clusters," each of which comprises five schools. In collaboration with and under the guidance of the regional director, the direct work with the teachers in these clusters is done by a team of teacher leaders called "cluster leaders." They are classroom teachers with personal experience and credibility to help their peers change classroom practice.

Direct work with schools and teachers is done on a year-round basis, with 8 to 12 days during the school year and intensive summer (or off-track) work. Schools participate for a minimum of three full years. The combination of learning experiences allows time for teachers to address a wide range of issues. Teachers discuss current research on learning and effective instructional strategies, debate the nature of mathematics, and redefine basic skills. They are involved with the other schools in their cluster in a learning community. They experience first-hand the curriculum reform by learning how to teach new state-of-the-art curriculum "replacement" units. After trying these units out in their classrooms, they debrief with other network members.

In addition, teachers receive in-class support. Cluster leaders visit each school several times during the year. Teachers are encouraged to collaborate with colleagues by peer coaching. Regional directors work with administrators to explain how they can best support their teachers through the process of reform.

Districts provide time for professional development in a variety of ways. Math Renaissance activities take place on student release days, on regular school days with substitutes provided for teachers, and/or on afternoons, weekends, and in summer institutes where teachers are provided stipends.

Process

- training
- curriculum development
- coaching
- replacement units
- sustained time for professional development
- connection to research on learning and teaching

Intended Audience

- entire school
- entire department

Summary of Results

Mathematics Renaissance has positively impacted student achievement in mathematics and teacher instructional behaviors, and influenced district policy regarding curriculum and instructional materials.

Mathematics

Evidence of Increased Student Achievement

Success Indicators

- New Standards Exam in Mathematics
- case studies

Mathematics Renaissance student performance was assessed in a subset of classrooms across the state of California. The 1994 New Standards Reference Exam was administered in the spring of 1995. Students in the Renaissance sample participated in two days of testing on a range of performance tasks of 5, 15, and 45 minutes in duration. The exam was scored by Renaissance staff and teachers using New Standards scoring rubrics during a summer professional development seminar.

Analyses of the scores were performed by New Standards staff. In the analyses, Mathematics Renaissance students consistently scored significantly higher than the multi-state comparison group. Overall findings indicate that there is strong, statistically significant evidence that students in the Renaissance sample performed at higher levels on all aspects of the New Standards exam, including skills, concepts, and problem-solving. This is especially noteworthy given the demographics of the Renaissance and multi-state comparison groups. The Renaissance sample schools were composed of more students from groups historically under-represented in mathematics classes.

The professional development resulted in significant changes in classroom practice, documented by case studies, school profiling, survey data, and the SRI case study evaluation. The SRI case study draft (April, 1996) indicated that "there is ample evidence that practice is changing in many classrooms." It observed some common themes in terms of teacher changes: active student participation, teacher as facilitator of student learning, real mathematics, a view of mathematics as a process, and a commitment to equity.

THE BOTTOM LINE

✪ ✪ ✪ ✪

Middle Grade Mathematics Renaissance is an extensive project designed to help individual schools improve instruction in mathematics. Its unique design, which entails working at the school site within a network of collaborative schools, sets it apart from other efforts. Middle Grade Mathematics Renaissance has demonstrated that it increases student learning as measured by assessments designed to evaluate the application of mathematics in authentic settings.

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✓ Sierramont Middle School
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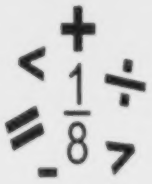
Web site: unavailable

DOCUMENTATION

Acquarelli, K. & Mumme, J. A. (1996, March). Renaissance in mathematics education reform in *Phi Delta Kappan, 77*, 478-484.

Loucks-Horsley, S., Hewson, P., Love, N. & Stiles, K. (1998). *Designing Professional Development for Teachers of Science and Mathematics*. Thousand Oaks, CA: Corwin Press.

Sparks, D. & Hirsh, S. (1997). *A New Vision for Staff Development*. Alexandria, VA: Association for Supervision and Curriculum Development.



Peoria Urban Mathematics Plan for Algebra

Program Description

Content

- high expectations for all students
- engaging students in worthwhile mathematical tasks
- using collaborative groups
- increasing student discourse about mathematics
- algebraic concepts

Peoria Urban Mathematics Plan for Algebra (PUMP) is a systemic effort to increase the number of students, particularly minorities, in the algebra track. The project aims to use middle school math as the "pump" rather than the "filter" in the mathematics pipeline.

PUMP is a collaborative effort among teachers, students, administrators, community and business groups, and faculty and graduate students from Illinois State University's Department of Mathematics. The centerpiece of the project's work is a teacher enhancement program that features three intensive summer sessions for teachers with follow-up seminars and classroom-based support during the school year.

The philosophy is that through enhanced forms of instruction all students can learn a broader range of mathematics including procedures and concepts. The guiding instructional strategies are (1) having high expectations for all students, (2) engaging students in worthwhile mathematical tasks, (3) using collaborative groups, and (4) increasing student discourse about mathematics.

Program Context

Context

- mid-sized urban city
- 55 percent minority student population
- high level of community and business support

Peoria Public Schools serves 17,000 students within a middle-sized urban city. Student population is 55 percent minority, mainly African American. Only 27 percent of the African American student population was taking some form of algebra before the project, compared to 76 percent of the white student population. Strong community and business collaboration enhances the program. After-school tutoring programs, PUMP Algebra Club, Saturday enrichment activities, and summer PUMP Algebra programs for high-risk middle school students are supported by various community groups. This environment promotes and supports qualitatively different approaches to teaching and learning middle school mathematics and encourages more representative entry into the algebra track.

Staff Development Program

The professional development program focused on three components of improving teacher performance: teachers' content knowledge; teachers' pedagogical and professional knowledge; and classroom-based support for the implementation of new knowledge into practice.

Three-week institutes held each summer involved teachers in doing mathematics and reflecting on mathematics teaching and learning. Topics for the institutes included rational numbers and proportional reasoning in Year 1; algebraic thinking in Year 2; and geometry, probability and statistics in Year 3. In addition to their learning, teachers were given time to redesign and reorganize their mathematics program to incorporate enhanced forms of instruction. Part of each summer's assignment was to develop an instructional plan for the following school year. Following the summer institutes, six half-day seminars were held during the academic year to extend content, redesign typical textbook lessons to reflect the new instructional strategies, reflect on their practices, complete a specified task related to the instructional strategies, and to try instructional strategies with their students.

In addition to the seminars, classroom-based support was provided to the teachers. Site visits were made every other week to each school and included demonstration lessons, co-teaching, observing a lesson, and curriculum resources. Each support activity was discussed with the teacher following the activity to support reflecting on his or her own practice. Each year at least some of the schools received weekly visits. During Year 3, project staff support decreased and collegial support was encouraged to increase teachers' independent use of the instructional strategies.

Process

- training
- demonstrations
- remodeling lessons
- coaching
- reflecting
- observation
- co-teaching

Intended Audience

- representatives from all middle schools in the district
- entire department or team
- entire school

Mathematics

Summary of Results

The PUMP Algebra program has increased student achievement at eighth grade, improved teachers' practices, and increased minority student partici-pation and representation in high school algebra.

Evidence of Increased Student Achievement

Success Indicators

- state mathematics tests
- algebra enrollments at middle and high school
- minority student enrollment in algebra
- surveys

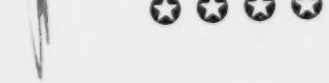
Peoria Urban Mathematics Plan for Algebra has impacted student achievement, teachers' beliefs, and instructional practices. Pre-project scores and annual scores of student achievement on the Illinois Goal Assessment Program (IGAP) were collected in March of each year. The sixth-grade scores, while demonstrating an overall increase in the district of 10 points, increased in seven of the 14 schools, decreased in six, and remained the same in one after only two years of implementation (most recent data available). Differences in scores were not statistically significant. At the eighth grade, scores increased in 13 of the 14 middle schools. The mean increase of 13.2 points across all schools was a significant ($p<.05$).

While the results at sixth grade are not yet significant, possibly due to the brief implementation time and the low number of sixth-grade teachers in the project, the increase at half of the schools shows promise for continued improvement. The strong results at the eighth grade demonstrate that the program has the potential to dramatically improve student achievement.

Overall algebra enrollments at the middle school increased slightly, with the minority population increasing slightly. However, at the high school the proportion of minority students enrolled in algebra increased from 42.5 percent to 54.3 percent, and the percentage of minority population actually enrolled in high school algebra increased from 15.7 to 22.6.

Survey results indicate that teachers reflect on their teaching and incorporate new instructional strategies into their practice. Statistically significant differences were found in instructional beliefs and practices in five of the eight clusters of the Mathematics Learning and Teaching Survey.

THE BOTTOM LINE



UMP Algebra has increased student achievement in algebra at the eighth ade, improved teacher practices, and increased minority-student participation nd representation in high school algebra.

SAMPLE SITES

✓ Calvin Coolidge Middle School
Hedy Stone
Lead Math Teacher
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✓ Rolling Acres Middle School
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Teacher
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fax: 309-693-4423
e-mail:
cougars@iaonline.com/users/cougars
web site: unavailable

✓ White Middle School
Betty Zilkowski
Teacher
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Peoria, IL 61603
phone: 309-672-6567
fax: unavailable
e-mail:
wmiddle@cyberdesic.com
web site:
www.cyberdesic.com/surfers/wmiddle/

Mathematics

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Web site: unavailable

DOCUMENTATION

Swafford, J. & Thornton, C. (1998). *The PUMP Algebra Project.* Unpublished paper.

Staff Development Program

Powerful Connections integrates a variety of models of staff development. The program is separated into three strands, with one strand per year as the focus of the professional development component. In Strand I an interdisciplinary unit is developed to include the Tsongas Industrial History Center's resource guide. During Strand II, a videotaped lesson is observed, assessed, and reflected on. The lesson is used by inservice and pre-service teachers for analysis of teaching. Finally, during Strand III, a publishable-quality action research report is completed, based on teachers' classroom research. Participating schools are evenly distributed among the three strands.

Each of the three strands incorporates workshops, observation and analysis of other teachers' lessons, written reflections, and developing new curriculum. Each strand includes a minimum time for structured and unstructured collabo-ration and learning experiences: Strand I, 41 hours; Strand II, 38 hours; and Strand III, 28 hours. Additional hours are often added to the minimum. Both during- and after-school time are devoted to staff development opportunities, with teachers receiving a stipend for after-school hours.

Teacher leaders, one from each school in the district, receive approximately 12 additional hours of training to conduct workshops for their colleagues within their school and in other schools in the district in partnership with program staff. Teacher leaders facilitate discussions, serve as mentors, and initiate a professional development plan for their individual schools. Teacher leaders receive a stipend for their additional work.

Process

- training
- observation
- lesson development
- action research
- videotape analysis
- mentoring/ coaching

Intended Audience

- teacher leaders
- individual volunteer teachers

Mathematics

Summary of Results

Both students and teachers benefited from Powerful Connections. Student performance in mathematics increased significantly in one year. Teachers increased their understanding and use of writing about mathematics and application of technology, especially for data gathering, statistics and probability, and functions. The emphasis on integrating mathematics with other disciplines and on teachers' classroom-research promotes collaboration among teachers and leads to increased opportunities for further professional development.

Sample Sites

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web site: unavailable

✓ Dr. An Wang Middle School
Kathleen MacDonald
Teacher/Leader
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web site: 198.114.221.2

✓ Bartlett Middle School
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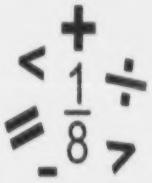
Documentation

Panasuk, R. M. & Sullivan, M. M. (1999). *Powerful Connections: Mathematics in the Middle School.* Lowell, MA: Author.

Panasuk, R. M. (1999). *The Guide to Math and Science Reform: An Online Resource for Education Community* [On-line]. Available: www.learner.org/theguide



Rice University School Mathematics Project

Program Description

Content

- problem-solving skills
- using manipulatives
- using technology
- student-centered instructional strategies
- reflective practice
- lesson design

The Rice University School Mathematics Project (RUSMP) provides training for Houston-area mathematics teachers to improve, deepen, and expand teachers' content and pedagogical knowledge of mathematics. The program was initiated in 1987 to serve as a bridge between Rice University's mathematics research community and Houston-area mathematics teachers.

The program involves three distinct components. First, the Summer Campus Program is a four-week professional development in mathematics content and delivery for teachers in grades K-12. Second, the School Year Campus Program involves university courses taught at Rice University. The courses are specifically designed for teachers of mathematics. Third, Urban School Programs are year-round school-based programs in which support-teachers interact with mathematics teachers and their students in a given school.

The Urban Schools Program also includes a four-week summer school session for at-risk students. District personnel arrange the site and select the students and teachers. RUSMP staff designs the curriculum and trains RUSMP support-teachers. RUSMP support-teachers help teachers: create a student-centered curriculum and activities that use calculators, computers, and other manipulatives; design mathematics projects; and use alternative assessments.

Context

- urban middle school
- largely minority student population
- large percentage of low-income students

Program Context

RUSMP's Urban Program was conducted first in Houston Independent School District's North Central District. Fifty percent of the students in HISD are Hispanic, and 36 percent are African American. The majority of the students are of lower socio-economic status, were at-risk students, and had already failed two of more years of school. Approximately 400 students attended the program over the three years and were taught by 21 mathematics and language arts teachers with a student-to-teacher ratio of approximately 10:1.

Staff Development Program

The staff development used in RUSMP's Urban School Program is an example of job-embedded staff development. It involves a preliminary training program and ongoing support and coaching throughout the school year.

Teachers who participate in the Urban School Program attend a three-day preparation program prior to the beginning of summer school. In this program teachers are given the opportunity to experience the learning activities students would experience during the first week of school. Support teachers model the lessons, demonstrate the classroom environment that supports hands-on learning, and encourage teachers to participate as students.

Following the three-day preparation program and a fairly well-prepared first week's curriculum and instructional activities, teachers are responsible for planning the remaining weeks' curriculum, instruction, and assessment. They work used by other teachers. Each team holds a day-long inservice presentation on their curriculum. Each Friday, a teaching team presents its curriculum in a training format to the other teams. While the number of learning activities included in the Friday sessions usually exceeds what teachers can do within a week, these sessions are designed to give teachers choices of other activities to take into the academic school year.

Support teachers visit each teacher's classroom to provide ongoing coaching and feedback throughout the subsequent school year. They also provide demonstration lessons, co-teach with the teacher, and help solve problems related to curriculum, instruction, and assessment. Through ongoing dialogues, teachers are given opportunities to discuss their experiences with the new instructional processes and reflect on what works for them and their students.

Process

- training
- demonstrations
- modeling
- classroom coaching

Intended Audience

- entire school
- entire department
- individual volunteer teachers

Mathematics

Summary of Results

RUSMP increases student academic achievement in mathematics as a result of teachers' learning to use new instructional strategies in their classrooms with the assistance, guidance, and feedback from support teachers.

Sample Sites

✓ Revere Middle School
Carolyn Nash
Associate Principal
10502 Briar Forest
Houston, TX 77042
phone: 713-917-3500
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web site:
www.houston.isd.tenet.edu/reverems

✓ Deer Park Independent School District
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Deputy Superintendent
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✓ Bethune Academy for Mathematics, Science and Fine Arts
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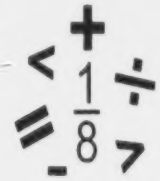
Documentation

Papakonstantinou, A., Berger, S., Wells, R.O., Jr. & Austin, J. (1996, Nov-Dec). The Marshall Plan: Rice University Mathematics Affiliates Program. *Schools in the Middle, 4*, 39-46.



University of Illinois at Chicago All Learn Mathematics

Mathematics

Content

- algebra readiness
- problem-solving
- inquiry-based instructional strategies
- cooperative learning approaches
- use of manipulatives
- use of scientific calculators
- redefining teachers' role

Context

- diverse student populations including large populations of minority and low income students
- diverse school settings including rural, urban, and suburban schools

Program Description

University of Illinois at Chicago—All Learn Mathematics (ALM) is a comprehensive staff development program for fourth- through ninth-grade teachers in the Chicago Public Schools. It includes classroom implementation of standards-based curricula, development of teacher leadership, follow-up, and math-related programs for families and students. Since 1995, the program has included more than 600 teachers in over 44 schools. The staff development program uses Maneuvers with Mathematics® and Connected Mathematics® materials. Approximately 50 percent of the mathematics teachers involved in the program during the study had four or fewer semesters of mathematics in college. Sixty percent had more than six years of teaching experience. Priori-ties of the study were to change teachers' practice and upgrade their understanding of mathematics. All Learn Mathematics built teachers' understanding of concepts such as problem-solving, algebra readiness, and use of scientific calculators, as well as developing their comfort with the instructional techniques that foster inquiry-based teaching and learning processes.

The program's goals are to incorporate students as partners in mathematics reform efforts, to promote broad-based community understanding and support for mathematics improvement, and to identify leadership committees to take responsibility for the continuous upgrading of the mathematics program.

Program Context

The program is currently implemented in 44 public schools in Chicago in grades 4-8. The schools' student population is extremely diverse. In some schools more than 98 percent of the student population is identified as low income. Several have 100 percent African American students; one has over 98 percent Hispanic students; and several have over 60 percent Limited English Proficient students.

Staff Development Program

The staff development program for the University of Illinois at Chicago—All Learn Mathematics consists of a minimum of 60 hours of staff development outside the classroom and 40 additional hours of staff development in classrooms. Staff development sessions are conducted by facilitators who are experienced teachers with master's degrees in mathematics education. All ALM staff development workshops are conducted as seminars/discussions groups. A portion of each workshop is devoted to problem-solving sessions, in which teachers actively explore, share, and discuss mathematics and classroom lessons. Teachers also discuss a variety of school-related issues at the workshops.

A high priority of the staff development sessions is increasing the mathematical competence of participating teachers. Topics include problem-solving, algebra readiness, and use of scientific calculators in addition to facilitating learning groups, engaging students in inquiry and experimentation, using manipulatives, helping students construct their own mathematics ideas, and using alternative assessments.

Staff development in the teachers' classrooms is provided by an ALM Program Associate, and includes peer coaching, co-teaching, and modeling lessons. Workshops are held on Saturday mornings, after school, on release time, on professional development days, and during restructured days. In some schools *all* staff participate in the staff development program. In others, only mathematics teachers participate.

Process

- training
- modeling
- practice opportunities
- institutes
- lesson designing
- resource materials
- videotapes

Intended Audience

- entire school
- entire department or team
- individual volunteer teachers

Mathematics

Summary of Results

Not only does the University of Illinois at Chicago—All Learn Mathematics program increase student achievement in mathematics at all participating schools, it increases teachers' understanding of mathematics and use of appropriate instructional strategies to create student-centered classrooms. As a result of ALM, significant changes in mathematics education were made, and a greater accountability for schools, students, teachers, and administrators has been initiated.

Evidence of Increased Student Achievement

Success Indicators

- norm-referenced tests
- teacher surveys
- teacher interviews
- classroom observations

University of Illinois at Chicago—All Learn Mathematics improved student performance on the Iowa Test of Basic Skills. For the schools participating in both the first and second cadre, all improved their mathematics scores. The degree of improvement varied by schools with increases occurring at the lowest-performing as well as at the highest-performing schools. Differences in the number of students performing at or above the national norm at five of the six schools in the first cadre (schools that participated between 1995 and 1997) were statistically significant when compared to the control group. In the second cadre (schools which began in 1996), the difference in the number of students performing at or above the national norm at seven of the 18 schools was statistically significant, when compared to the control group. The lower performance of students in the second cadre is most likely due to the length of implementation.

Changes in teachers' practices were also attributed to All Learn Mathematics. Interview and survey results indicate that, as a result of participating in the staff development programs, teachers' attitudes about mathematics improved; classroom instructional practices shifted from lecture or teacher-centered to student-centered and students working in cooperation with each other; and teachers' preparedness to teach mathematics, including their own understanding of mathematics concepts, improved. Teachers felt well-prepared to have students work in cooperative groups, practice computational skills, and engage students in inquiry-oriented activities. They also felt competent to use performance-based assessment and informal questioning, lead a class of students on investigative strategies, and manage students engaged in hands-on or project-based work.

THE BOTTOM LINE

University of Illinois at Chicago—All Learn Mathematics has led to improved math performance at each school where it has been implemented. The schools in which ALM has been implemented are educationally challenging. Greater results for schools involved for two years rather than one year are evident. All Learn Mathematics is a successful program for changing teacher knowledge and pedagogy in middle school mathematics. As the program expands, continuing improvement in student performance is expected.

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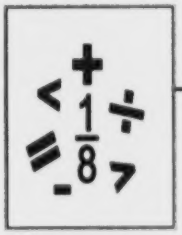
DOCUMENTATION

All Learn Mathematics Annual Evaluation Report 1996-97. (1997). Chicago: University of Illinois at Chicago.



Standards for Mathematics

National Council of Teachers of Mathematics, 1989

In grades 5-8, the mathematics curriculum should include:

1. **Mathematics as Problem-Solving**
   Numerous and varied experiences with problem-solving as a method of inquiry and application
2. **Mathematics as Communication**
   Opportunities to communicate
3. **Mathematics as Reasoning**
   Reasoning permeated throughout the mathematics curriculum
4. **Mathematical Connections**
   The investigation of mathematical connections
5. **Number and Number Relationships**
   The continued development of numbers and number relationships
6. **Number Systems and Number Theory**
   The study of number systems and number theory
7. **Computation and Estimation**
   The concepts underlying computation and estimation in various contexts
8. **Patterns and Functions**
   Explorations of patterns and functions
9. **Algebra**
   Explorations of algebraic concepts and processes
10. **Statistics**
    Explorations of statistics in real-world situations
11. **Probability**
    Explorations of probability in real-world situations
12. **Geometry**
    The study of the geometry of one-, two-, and three-dimensions in a variety of situations
13. **Measurement**
    Extensive concrete experiences using measurement

Table 3: Standards for Mathematics

Ideal programs promote or develop the following standards:	HALP	Introducing Math Teachers to Inquiry*	Mathematics Renaissance	Peoria Urban Mathematics Program	Powerful Connections	Rice Univ. School Mathematics Project	Univ. of Illinois at Chicago - All Learn Math.
Problem Solving • In grades 5-8, the mathematics curriculum should include numerous and varied experiences with problem solving as a method in inquiry and application.	X	X	X	X	X	X	X
Communication • In grades 5-8, the study of mathematics should include opportunities to communicate.	X	X	X	X	X	X	X
Reasoning • In grades 5-8, reasoning shall permeate the mathematics curriculum.	X	X	X	X	X	X	X
Mathematical Connections • In grades 5-8, the mathematics curriculum should include the investigation of mathematical connections.	X	X	X		X	X	X
Number and Number Relationships • In grades 5-8, the mathematics curriculum should include the continued development of numbers and number relationships.	X		X	X	X	X	X
Number Systems and Number Theory • In grades 5-8, the study of mathematics should include the study of number systems and number theory.	X		X		X	X	X
Computation and Estimation • In grades 5-8, the mathematics curriculum should develop the concepts underlying computation and estimation in various contexts.	X		X		X	X	X

Table 3: Standards for Mathematics

Ideal programs promote or develop the following standards:	HALP	Introducing Math Teachers to Inquiry*	Mathematics Renaissance	Peoria Urban Mathematics Program	Powerful Connections	Rice Univ. School Mathematics Project	Univ. of Illinois at Chicago - All Learn Math.
Patterns and Functions • In grades 5-8, the mathematics curriculum should include explorations of patterns and functions.	X		X	X	X	X	X
Algebra • In grades 5-8, the mathematics curriculum should include explorations of algebraic concepts and processes.	X		X	X	X		X
Statistics • In grades 5-8, the mathematics curriculum should include exploration of statistics in real-world situations.	X		X	X	X	X	X
Probability • In grades 5-8, the mathematics curriculum should include explorations of probability in real-world situations.	X		X	X	X	X	X
Geometry • In grades 5-8, the mathematics curriculum should include the geometry of one-, two-, and three-dimensions in a variety of situations.	X	X	X	X	X	X	X
Measurement • In grades 5-8, the mathematics curriculum should include extensive concrete experiences using measurement.	X	X	X		X	X	X

* Teachers select the content and standards to address in their classes. As a result, this program may meet more standards than indicated here.

SCIENCE PROGRAMS

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Student Watershed Research Project (SWRP) 126

Overview
Science Staff Development Projects

JoAnne Vasquez, National Advisory Panel, National Science Teachers Association

The arrival of the 21st century requires more extensive and effective approaches to professional development to address the many challenges in science education. In this increasingly shrinking, technological world, there is, more than ever, a need to educate all our students to become scientifically literate citizens. This need to educate an ever increasingly diverse student population with different histories, cultural perspectives, experiences, and information poses new challenges for our science education system.

The National Science Education Standards (NSES) were published in 1997 and have been instrumental in helping to articulate changes being made in new state standards which are emerging across the country. State standards are shifting away from the teaching of facts, toward increased emphasis on broad-based conceptual understanding, problem-solving, inquiry, critical thinking skills, collaboration among learners, and alternatives to traditional assessment.

The five results-based science programs that have been chosen for inclusion in this guide have the common thread of systemically changing teachers' pedagogical practices and content knowledge over sustained periods of time, rather than "one shot" or "quick-fix" programs. They have engaged the teachers as learners by helping them implement programs that emulate the new approaches to science teaching called for in the NSES.

These programs all lasted more than a year and some involved an entire state or a coalition of states. Each of these projects, which can be replicated in other places, clearly demonstrates the importance of teachers being co-learners in professional development experiences. The programs also emphasize that the individual school is the point where deep change can occur.

EarthStorm

Program Description

EarthStorm, a teacher enhancement program, allows K-12 teachers in Oklahoma to incorporate real-time weather data into classroom activities. The program could be replicated in other states. The multidisciplinary project combines meteorology, climatology, computer graphics, telecommunications, geography, and agriculture in applied environmental experiments. Staff at the Oklahoma Climatological Survey at the University of Oklahoma coordinate the project. With initial funding from the National Science Foundation and the U.S. Department of Energy (via the Atmospheric Radiation Measurement Project), teachers who complete the summer institutes receive computer hardware and software to implement what they have learned, at their own schools.

EarthStorm provides schools with data every 15 minutes from the Oklahoma Meso-network, 115 automated environmental observing stations distributed throughout Oklahoma. EarthStorm provides the tools for initiation, implementation, and evaluation Mesonet data in classrooms. Teachers learn to use the Mesonet equipment, integrate weather data collection and analysis into their classrooms, and further their own understanding of the areas of science involved in the project. Teachers integrate weather analysis into existing curriculum to enhance students' knowledge and skills.

Content

- use of Oklahoma Mesonet measurements
- weather data collection
- analysis of weather data
- curriculum design
- principles of meteorology, climatology, and geography

Science

Program Context

Teachers and students from school districts throughout Oklahoma participate in EarthStorm training. Urban, suburban, and rural schools, as well as schools with high poverty and minority concentrations, are represented on the list of EarthStorm schools. High-need students, gifted students, and deaf students participate in weather data collection and analysis. Teachers from rural areas are able to enrich their schools and classrooms with access to sophisticated equipment and data that is not traditionally available to their students.

Context

- variety of school contexts: rural, urban, and suburban
- large populations of high-poverty students
- high-needs students, including: special needs, at-risk, gifted, and hearing-impaired students

Staff Development Program

EarthStorm began with a core group of teachers who participated in a month-long summer institute that emphasized computer skills, basic meteorological principles, and integrating Mesonet data into the classroom. Follow-up institutes in subsequent summers allowed professional meteorologists and teachers who had participated in EarthStorm to create a curriculum for teachers to use in their classrooms. It is now available nationally.

Currently the staff development associated with EarthStorm includes a wide variety of workshops. The three-day introductory course incorporates an introduction to the Oklahoma Mesonet, introduction to the Oklahoma Mesonet Bulletin Board System, and Introduction to WxScope. Follow-up workshops vary from two hours to one day in length and focus on specific aspects of the program. All courses are taught by Oklahoma Climatological Survey staff members and Oklahoma teacher leaders who have implemented EarthStorm in their classrooms. Workshops are made up of small groups of teachers in well-equipped facilities, so teachers have hands-on experiences with the hardware and software their students will use.

Teacher training incorporates a) computer use; b) curriculum development; c) lesson application and data analysis software; d) a computer bulletin board; e) an educational newsletter; f) half-day science fairs; and g) continuing mentorship program with science mentors from the various federal and state meteorological facilities in Oklahoma. Teachers have ongoing support provided by the professional scientists who serve as mentors. In addition, they have networking opportunities through the bulletin board system and the Mesonet/ARM Science Fair.

Process

- training
- follow-up institutes
- curriculum development
- mentors
- electronic support
- networking

Intended Audience

- individual volunteer teachers

Science

Summary of Results

Teachers and students increased their knowledge and understanding of meteorology and climatology. Using engaging software and authentic opportunities to do the work of real scientists, students in EarthStorm classrooms improved their performance on state and national tests in science, participated in — and won —l ocal, regional, and state science fairs, and moved on to more advanced course work in science and math.

Evidence of Increased Student Achievement

Success Indicators

- norm-referenced tests in science
- state science proficiency test
- participation in science fairs
- females' participation and interest in science
- pursuit of advanced course work in science

There is no single measure demonstrating increased student achievement as a result of EarthStorm; however, drawing from multiple data sources from around the state, it is evident that EarthStorm has led to significant increases in students' learning. In one high-poverty, rural school district, students' performance on the ITBS science portion for three years during the school's involvement in EarthStorm averaged at the 77th percentile. Students in Sulphur, Oklahoma, increased their pass rate on the Oklahoma Proficiency Test for Science from 71 percent to 91 percent in one school year. The average score was 84 percent. A large number of students working with mentors won awards and recognition in state and local science fairs during the same three-year period. Participation in the Mesonet/ARM Science Fair increased from 25 students in 1993 to 112 students in 1996.

Several teachers report that engaging difficult, at-risk students in weather data recording and analysis has increased their achievement in all academic areas. Gifted students also became more successful in school as a result of their involvement in EarthStorm. Student weather forecasters were often more accurate in their predictions of weather than professionals. Teachers reported that students increased interest in science and pursued advanced coursework in science and math. In addition, girls demonstrated more interest in and success in science as a result of EarthStorm.

Science

THE BOTTOM LINE

EarthStorm engages students in real-time data collection and analysis and gives their teachers opportunities to foster students' achievement in science. The staff development program incorporates the skills teachers need to take the EarthStorm Project back to their classrooms. This project has unique and diverse methods for demonstrating the link between staff development and student achievement.

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Science

DOCUMENTATION

Cavallo, N. & Gerber, B. (1993). *The effects of EARTHSTORM, a technology-based NSF sponsored institute for middle school science teachers.* Annual Conference of the National Association for Research in Science Teaching, April 17, 1993, Atlanta, GA.

McPherson, R.A. & Crawford, K.C. (1996, April). The EARTHSTORM Project: Encouraging the use of real-time data from the Oklahoma Mesonet in K-12 classrooms. *Bulletin of the American Meteorological Society.*

Foundational Approaches in Science Teaching

Program Description

Content

- physical, biological and earth science concepts
- environmental issues
- inquiry-based investigations

Foundational Approaches in Science Teaching (FAST) is an interdisciplinary science program designed to meet the developmental needs of adolescents 12- to 15-years old. While it leans heavily on a curriculum for grades 6-10, the program has an extensive, required staff development component that prepares teachers to teach science concepts in constructivist ways and helps develop teachers' content knowledge.

The program emphasizes basic concepts and methods of the physical, biological, and earth sciences and relates these to practical issues of human use of the environment. FAST is designed around three courses of study. FAST 1 focuses on the local environment; FAST 2 addresses matter and energy in the biosphere; and FAST 3 emphasizes change over time. The content is organized into three strands: physical science, ecology, and relational study. In the FAST program, students are actively engaged in conducting scientific investigations to discover key concepts and principles. FAST students also explore relationships among the various science disciplines and societal issues.

The structure of the program develops scientific literacy to provide students (1) the background necessary for understanding and appreciating concerns that arise in a technological world and (2) the essential tools for further study in the sciences. FAST stresses increasing students' ability to communicate what they are learning through the use of oral reports, project work, graphing, flow charts, and diagramming. FAST helps students develop thinking skills, laboratory skills, and increase their knowledge of the foundational concepts.

Context

- 36 states
- 10 countries
- varied student populations and school contexts

Program Context

Foundational Approaches in Science Teaching is currently used by 6,000 teachers in 36 states and 10 countries. It is being used successfully in all types of schools with a full range of students in the middle grades. The program is available in Braille and has been translated for use in Japan, Russia, Slovakia, and other countries.

Staff Development Program

Foundational Approaches to Science Teaching requires intensive teacher development. Prior to implementation of any course, teachers are immersed in a 10-day inquiry investigation for each FAST course. Each segment models the variety of teaching behaviors inherent within the FAST program and provides opportunities for discussion of the learning, teaching, and assessing process. In the institutes, certified FAST instructors model constructivist teaching strategies while participants conduct the same investigations their students will conduct. The institute's content focuses on concept development and the issues, challenges, and rewards of inquiry-based instruction. Debriefing of the investigations helps teachers identify instructional strategies used during the investigation. Participants also review issues related to safety, unexpected data or results, alternative procedures, lack of appropriate science equipment, and handling students with special needs.

In addition to the institutes, ongoing support is provided. Monthly meetings are held to discuss problems associated with implementation, content, or instruction, and to provide extended training. Other electronic and print support systems are in place. Teachers have access to an 800 number, e-mail, newsletters, and a Website for continued support and information.

Process

- training
- modeling
- demonstration lesson
- ongoing monthly meeting
- coaching
- electronic and print support

Science

Summary of Results

The FAST program increases students' understanding of basic science concepts; laboratory skills, processes, and knowledge; and creative thinking. Primarily a curriculum program with intensive staff development support, FAST has international acclaim as a middle school science program that successfully improves science performance of all students regardless of gender, ability, race/ethnicity, or socio-economic condition.

Intended Audience

- entire department
- entire team

Evidence of Increased Student Achievement

Success Indicators

- norm-referenced tests
- Fukuola, Ishikawa, Nakayama (FIN) Test
- Laboratory Skills Test
- Performance Process Skills Test
- Torrance Test of Creativity
- Scholastic Aptitude Test
- Verbal and Figural Batteries of the Scholastic Testing Service

Foundational Approaches in Science Teaching has a long history of success and evidence of its impact on both teacher and student learning. In a 1988 experimental pre-test/post-test evaluation of classrooms of grade 6 and 7 students, students in FAST demonstrated significant improvement in their laboratory skills, science processes, and science achievement at each grade level. Assessment instruments included the Laboratory Skills Test, Performance Process Skills Test (POPS), Fukuola, Ishikawa, Nakayama Test (FIN), and California Achievement Test (1988).

California Achievement Test scores of students in schools using FAST were compared to those of students in non-FAST schools in one district in California. The comparison demonstrated that FAST students scored well above their highest expected scores, while students not using the FAST curriculum scored significantly below them (1987).

In Hawaii, California, South Carolina, and Washington, FAST students scored significantly better than non-FAST students on the CTBS standardized science test during assessments conducted between 1982 and 1986. In 1986, FAST demonstrated a significant impact on students' thinking skills as measured by the Torrance Test of Creativity, Verbal and Figural batteries of the Scholastic Testing Service, and CTBS Science Test. FAST significantly affects student achievement in basic thinking skills, verbal creative thinking, and figural creative thinking. However, it does not jeopardize the mastery of science concepts.

THE BOTTOM LINE

Foundational Approaches in Science Teaching is both a curriculum and staff development program. It was recognized by the Educational Testing Service as an exemplary program for serving minority and female, middle-level students. The curriculum facilitates teachers' implementation of constructivist learning strategies within a well-defined curriculum. It was included as a model of the extensive preliminary training and ongoing support which provided teachers with the knowledge, skills, and confidence to make dramatic changes in their instructional practice.

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University of Hawaii Curriculum Research & Development Group. (1996). *Foundational Approaches in Science Teaching (FAST).* Manoa, HI: University of Hawaii Curriculum Research & Development Group.

Young, D. (1999). *Standards-Based Teacher Education Through Partnerships: Final Performance Report.* Manoa, HI: University of Hawaii Curriculum Research & Development Group.

Iowa Chautauqua Program

Program Description

The Iowa Chautauqua Program is a multi-state professional development project designed to enhance instructional processes of K-12 science teachers through the study of science, technology, and society. The project's overall goals are to improve K-12 science education through inservice experiences, develop a network for continuing teacher enhancement, develop teacher leaders, and develop positive interaction among teachers, students, administrators, parents, scientists, and business/industry sponsors. The program focuses on learning science in a "real-world" context.

Content

- constructivist instructional processes
- science concepts applied in "real-world" contexts
- teacher leadership

It aims to help students use science to meet personal needs, see how science can help solve current societal issues, help students be aware of how science is used in careers, and pursue science academically and professionally.

The constructivist learning model is the core of the instructional strategies that teachers learn. It emphasizes that every learner constructs his/her own meaning as opposed to hearing or reading about the scientific explanations and then committing the explanations to memory for recall on tests later.

The project began in Iowa in 1983 and was funded as the Iowa Scope, Sequence, and Coordination Project. It was sponsored by the National Science Teachers Association and funded by the National Science Foundation. Eleven states offer some form of the program to teachers. The long history and success of this program and its impact on student achievement in science have been the subject of numerous research studies.

Context

- multiple sites throughout Iowa and 10 other states

Program Context

The Iowa Chautauqua Program has been implemented in five of Iowa's 15 Area Education Agencies and in 10 other states. Data about student demographics are not available. Students in grades 4-9 were included in the assessment. However, teachers of students in grades K-12 have participated in the program. Schools and districts included rural, suburban and urban settings.

Science

Staff Development Program

The staff development model employed in the Iowa Chautauqua Program includes a three-week summer institute. In the training, teachers assume the role of students to explore issue-based questions. They look for key science concepts and study four different constructivist pathways for learning. The summer institute is a prelude to an academic year-long experience involving two three-day short courses, one in the fall and another in the spring. Continuous communication with central staff, lead teachers, and fellow participants occurs throughout the year. Lead teachers participate in ongoing action research within their classrooms, providing ongoing support for new teachers and serve as instructors for the summer institutes.

The staff development model for the Iowa Chautauqua Program recognizes that teachers are at the center of the change process. Teacher development and curriculum development are viewed as continuous improvement processes. The model is built upon ideas that closely align with the National Science Education Standards. It is characterized by the following key elements: (1) teachers are involved in planning, designing, and facilitating student learning experiences using constructivist teaching practices within a Science-Technology-Society context; (2) teachers work in site-based teams to develop and coordinate an integrated school science program for K-12 students; (3) teachers assess learning and analyze teaching to guide instruction; and 4) teachers work to create a community of learners with their students and other professionals within the school and beyond. The staff development model has four phases: invitation, exploration, coordination, and implementation.

Process

- training
- summer institutes
- demonstration
- curriculum development
- action research
- coaching

Intended Audience

- teams of volunteer teachers from schools

Science

Summary of Results

The Iowa Chautauqua Program increases teacher confidence in teaching science and increases teacher understanding and use of basic features of science. Lead teachers involved in the program have students who master more scientific concepts, better understand the basic processes of science, apply concepts and processes to new situations, develop more creativity skills, and have more positive attitudes about science, their science teachers, the usefulness of science, and science careers when compared to students in other classrooms.

Evidence of Increased Student Achievement

Success Indicators

- project-specific multiple choice tests
- National As essment of Educational Progress attitude survey

Multiple measures of student performance and changes in teacher practice indicate that the Iowa Chautauqua Program has produced positive results for students. For example, researchers have used project-specific, multiple choice tests to measure the concept, process, application, and creativity domains. The attitude domain was assessed using a Likert-type five point scale with items from the National Assessment of Educational Progress, Third Assessment of Science. Pre- and post-tests were administered to all students of 15 lead teachers in 1989-1990. In total, 723 students were assessed. The 15 lead teachers were selected from a pool of 50 Lead Teachers for the formal assessment. Lead teachers taught two or more sections, one serving as the control group with conventional instructional procedures and one serving as the experimental group with STS (science-technology-society) approaches to instruction. Data were also collected from at least one section of the 250 new teachers in the program. No contrasting data are available for those classrooms. Researchers state that the sample of teachers and students are representative of the larger population of teachers and students.

Results indicate that students in the control and experimental groups had similar conceptual knowledge about science on the post-test (effect size -0.03). Students participating in the Iowa Chautauqua Program had significantly higher gains in the process (effect size 2.20), application (effect size 3.21), creativity (effect size 2.12), and attitude (effect size 1.62) domains.

Science

THE BOTTOM LINE

The Iowa Chautauqua Program links staff development to student achievement. The research methodology used to obtain the initial results of the program has been criticized; however, over a number of years in a number of diverse implementation sites, the program consistently has increased students' performance in science. It is particularly noteworthy for the development of student assessments to measure increased student learning in five distinctly different domains of science knowledge and skill. Its extensive replication throughout 11 states is evidence of the program's widespread success as a staff development program that increases students' achievement.

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Science

DOCUMENTATION

Dass, P. & Yager, R. (1997, Summer). *Iowa Chautauqua Program Final Performance Report.* Iowa City, IA: Authors.

Science Partnership for Articulation and Networking

Program Description

Science Partnership for Articulation and Networking (SPAN) offers a thorough professional development program for schools interested in in-depth and sustained processes for department-wide change in science education. It became a middle school teacher enhancement program in 1997. However, it is an expansion of two highly successful programs: the California Science Implementation Network (CSIN) which began in 1988 as a statewide effort to improve elementary students' performance in science; and Scope, Sequence, and Coordination (SS&C), a high school program that originated in 1989.

SPAN's goals are to:

1. Develop on-site teams of middle school teacher-leaders, school science staffs, and administrators who are knowledgeable about the reform effort in science;
2. Provide in-depth professional development for entire middle school science departments on content (standards), pedagogy, leadership, and assessment;
3. Establish a systemic infrastructure that supports K-12 reform at the district and state level; and
4. Create an ongoing "Community Implementation Team" that maintains an advocacy for middle school science as a core subject.

SPAN received funding in 1997 from the National Science Foundation as a middle school teacher enhancement project. While relatively new, early results suggest that SPAN will lead to improved student performance.

Content

- inquiry-based content
- instructional strategies appropriate for science reform
- curriculum replacement units
- school-wide reform
- teacher leadership
- student assessment

Science

Context

- diverse school settings including urban, suburban, and rural schools
- diverse student populations including a large population of minority and low-income students

Program Context

One hundred and nine demographically diverse middle schools have participated in the intensive department-based staff development, directly affecting 160 lead teachers and 24,000 students, and indirectly influencing more than 870 science teachers and 130,000 students. Schools will continue to participate for a total of three years.

Staff Development Program

The staff development associated with SPAN is based on the successful models employed in its predecessor programs. It centers on enhancing teachers' content knowledge; addressing teachers' practices and beliefs; facilitating acquisition of pedagogical techniques that are effective for all students; analyzing student work for conceptual understanding and student growth; engaging administrators and the community in the reform efforts; and developing teacher leaders.

Extensive staff development is designed for each school with the support of an implementation team comprised of staff, community, and parent representatives. Each school plan responds to the unique needs of the school while ensuring that the staff development program aligns with the National Science Education Standards & Benchmarks, and California's Science Framework.

Lead teachers from each school attend a 21-day institute; administrators attend a four-day institute; parents and community representatives attend a two-day institute. An additional 50 hours of staff development are provided on-site for the entire science department.

Ten regional, full-time directors are responsible for clusters of schools within their region and guide the efforts of 20 staff developers who work with clusters of three to five schools. Lead teachers and the implementation team, with the support of the cluster staff developer, regional director, and teaching cadres are responsible for creating and maintaining department-wide change in science education. Their change efforts cover a wide range, from policy changes to changes in classroom practice. This complex staff development effort uses a variety of models of staff development that extend beyond traditional training.

Process

- training
- demonstrations
- modeling
- microteaching
- observations
- coaching
- curriculum development
- student work analysis

Intended Audience

- entire school
- entire department or team

Science

Summary of Results

The Science Partnership for Articulation and Networking (SPAN) increases student achievement in science in diverse middle school settings throughout California. In addition, it increases teachers' knowledge about science, in-structional practices, and leadership skills.

Evidence of Increased Student Achievement

Impact on student achievement is based on only one year's test results. However, if it follows the success of its predecessors — the California Science Implementation Network (CSIN) and Scope, Sequence, and Coordination (SS&C), both of which have produced significant results for students at the elementary and high school levels respectively — the long-term results should also be significant in terms of teacher learning and student achievement.

Success Indicators

- state content-area assessments

The assessment from the California Systemic Initiatives Assessment Collaborative (CSIAC) was given in a subset of middle school classrooms in the spring of 1997 to establish baseline data. The analysis of the baseline scores indicated that students in the SPAN schools were on par with their student peers throughout California and in other national sites such as Phoenix, Dallas, Puerto Rico, New Jersey, and Arkansas.

The same assessment was administered in 1998 and will be given throughout the duration of the SPAN grant. The assessment consists of enhanced multiple-choice questions, open-ended responses, and two performance tasks. It measures knowledge, skills, and scientific inquiry in life, earth, and physical science; science investigation; and science and technology issues.

The comparison of the 1998 SPAN students' performance to that of other students in the CSIAC network demonstrated that SPAN students outperformed their peers on every area measured by the assessment. The statistically significant improvement by students in the SPAN sample indicates that they had higher levels of performance on every aspect of the assessment. Teachers had gained additional strategies to use to teach the content successfully. Other indicators of success include increased teacher professionalism, increased teacher leadership, and district support for reform in science education.

THE BOTTOM LINE

Science Partnership for Articulation and Networking is a comprehensive staff development initiative that emphasizes extending teachers' content and pedagogical knowledge and skills in the content area of science. It incorporates NSDC's *Standards for Staff Development* and aligns the context, process, and content to ensure high quality professional development that leads to increased student achievement in science.

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Loucks-Horsely, S., Hewon, P., Love, N. & Stiles, K. (1998). *Designing Professional Development for Teachers of Science and Mathematics.* The National Institute for Science Education. Thousand Oaks, CA: Corwin Press.

Student Watershed Research Project

Science

Content

- data collection and analysis
- collaboration with outside agencies
- environmental stewardship
- engaging students in local environmental issues
- integrating watershed research into regular curriculum
- chemistry, microbiology macroinbertebrate inventory, vegetation inventory, habitat assessment

Context

- urban, suburban, and rural schools in Oregon and Washington
- varied student populations

Program Description

The Student Watershed Research Project (SWRP) involves teachers, students, scientists, businesses, governmental agencies, community groups, and metropolitan schools in Portland, Oregon, and Vancouver, Washington, in watershed education and collection of quality data. SWRP develops awareness, knowledge, skills, and commitment leading to responsible behavior and constructive actions with regard to water quality and watershed resources.

As citizen scientists, students learn to gather and use scientific information in in community decision-making. Students add valuable information to a regional watershed database and simultaneously gain an increased awareness of the complex issues involved in environmental stewardship.

SWRP is based at the Saturday Academy of the Oregon Graduate Institute of Science and Technology. Its goals are: (1) collaboration between science teachers, students, and practicing scientists; (2) provision of training, equipment, and materials for watershed monitoring; (3) maintenance of a database of student-collected data; (4) sharing of data with participating agencies and community groups; and (5) fostering stewardship of natural areas and natural resources by students. The Student Watershed Research Project models the value of partnerships among public schools, community agencies, and professional scientists. Those who wish to develop a similar program need to foster a partnership with local and/or state agencies and scientists whose work is related to the areas of focus in the science curriculum.

Program Context

SWRP began in 1991 and has trained 91 teachers who directly impact over 6,000 students in grades 8-12 from 18 public and private school districts in the Portland/Vancouver metropolitan areas. The SWRP model is being applied at 50 sites on streams that vary greatly in their physical, chemical, and biological make-up. SWRP has been applied in both middle and high schools.

Staff Development Program

Teachers who guide students' work in SWRP participate in the intensive five-day Riparian and Aquatic Ecosystem Monitoring: A Technical Training Workshop, offered in the summer months. Training includes both lab and field components and is taught by SWRP staff, classroom teachers, university faculty, research scientists, and state personnel. Content includes basic chemistry, advanced chemistry, microbiology, macroinvertebrate inventory, vegetation inventory, habitat assessment, data and communications, watershed connections, curriculum integration, community resources, and program design and assessment.

Following the training, three or four mandatory meetings are held throughout the year. Meetings address quality assurance/quality control procedures, data collection parameter updates, and innovative curriculum and community volunteering ideas. Ongoing technical support is provided to teachers involved in the program. SWRP staff serves as a resource for gathering information on parameters and protocols, sampling site background, and sampling and meeting coordination. SWRP technical staff orchestrate classroom visits and field sampling assistance with volunteers from agencies and organizations.

Teachers who integrate watershed analysis components in their classroom ex-pand their science knowledge and pedagogical processes by combining biology, chemistry, earth and life sciences with writing, mathematical, and statistical skills. Teachers work in areas beyond their content specialization and typically beyond what their curriculum normally includes. Teachers also refine data collection and analysis skills in order to help students mathematically model and statistically analyze their data findings.

Process

- training
- hands-on applications
- ongoing support meetings
- ongoing workshops to extend content
- technical support
- classroom visitations

Science

Intended Audience

- individual volunteer teachers

Summary of Results

The Student Watershed Research Project increases students' involvement in science and their ability to perform data collection and analysis as practicing scientists do. Student achievement is measured by the accuracy of the students' data collection and analysis, their ability to present their findings to their peers, scientists, and community members, and their involvement in regional watershed policy decisions.

Evidence of Increased Student Achievement

Success Indicators

- student data samples
- professional and peer review of student data analysis reports
- student presentations and displays

The evidence of student success for the Student Watershed Research Project is atypical. Rather than demonstrating increased performance on a standardized assessment of science knowledge, students demonstrate knowledge of data collection and analysis by having their test results compared to duplicate samples analyzed by professional laboratories. SWRP staff combine professional laboratory results with the students' data, provide feedback on the data for both the students and teachers, and audit student data. SWRP standards for reliability of student-collected data are very high. SWRP staff coordinate and supervise a rigorous quality assurance/quality control program.

The reproducibility of SWRP data allows local agencies to use the data to make policy decisions. The SWRP model has been recognized locally and nationally for the quality of the data produced, which reflects the quality of student and teacher performance. The data produced by students was used in a publication by Oregon's Department of Environmental Quality in establishing surface water quality standards for dissolved oxygen.

In addition, students write their group findings and then present them to a panel of their classroom peers. Students become "specialists" in the particular parameter they measure, and each group presents both background and findings for their testing during these presentations. Annual summits allow students to display data on posterboard and give oral presentations, where the quality and content of presentations are judged by various watershed health professionals. Students also have opportunities to provide information to regulatory agencies regarding the watershed they monitor.

Science

THE BOTTOM LINE

Student Watershed Research Project develops teachers' understanding of watershed research and provides an excellent model of authentic performance assessment for students. Intensive summer training for teachers is followed by a wide range of ongoing support to facilitate implementation of the learning in their classrooms. SWRP contributes to students' understanding, appreciation, and practice of science as a result of their teachers' participation in professional development hat models hands-on, practical learning experiences.

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Student Watershed Research Project. (1997). *Fifth Annual Student Watershed Summit: Summary Evaluation Comments*. Author.

Standards for Science

National Science Education Standards, 1996

As a result of activities in grades 5-8, all students should develop:

1. Science as Inquiry

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

2. Physical Science

- Properties/changes of properties in matter
- Motions and forces
- Transfer of energy

3. Life Science

- Structure and function in living systems
- Reproduction and heredity
- Regulation and behavior
- Populations and ecosystems
- Diversity and adaptations of organisms

4. Earth and Space Science

- Structure of the earth system
- Earth's history
- Earth in the solar system

5. Science and Technology

- Abilities of technological design
- Understandings about science and technology

6. Science in Personal and Social Perspectives

- Personal health
- Populations, resources, and environments
- Natural hazards
- Risks and benefits
- Science and technology in society

7. History and Nature of Science

- Science as a human endeavor
- Nature of science
- History of science

Table 4: Standards for Science

Ideal programs promote or develop the following standards:

	EarthStorm	FAST	Iowa Chautauqua	Science Partnerships for Articulation & Networking	Student Watershed Research Project
Science as Inquiry					
• abilities necessary to do scientific inquiry	X	X	X	X	X
• understandings about scientific inquiry	X	X	X	X	X
Physical Science					
• properties and changes of properties in matter	X	X	X	X	X
• motions and forces	X	X	X	X	X
• transfer of energy	X	X	X	X	X
Life Science					
• structure and function in living systems	X	X	X	X	X
• reproduction and heredity		X	X	X	X
• regulation and behavior		X	X	X	X
• populations and ecosystems	X	X	X	X	X
• diversity and adaptations of organisms		X	X	X	X
Earth and Space Science					
• structure of the earth system	X	X	X	X	
• Earth's history		X	X	X	
• Earth in the solar system		X	X	X	

Table 4: Standards for Science

Ideal programs promote or develop the following standards:

	EarthStorm	FAST	Iowa Chautauqua	Science Partnerships for Articulation & Networking	Student Watershed Research Project
Science and Technology					
• abilities of technological design	X	X	X		X
• understandings about science and technology	X	X	X		X
Science in Personal and Social Perspectives					
• personal health		X	X	X	X
• populations, resources, and environments	X	X	X	X	X
• natural hazards		X	X	X	X
• risks and benefits		X	X	X	X
• science and technology in society	X	X	X	X	X
History and Nature of Science					
• science as a human endeavor	X	X	X	X	
• nature of science		X	X	X	
• history of science		X	X	X	

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Overview
Social Studies Staff Development Programs

Mary McFarland, National Advisory Panel, National Council for the Social Studies

Three projects in social studies met the selection criteria and demonstrated improved student achievement. Project Legal, We the People ... The Citizen and the Constitution, and We the People ... Project Citizen are programs that share several qualities.

Each of the programs provides professional development that engages teachers in broadening their own content knowledge in such areas as constitutional themes and principles, democratic institutions, and the legal system. These staff development programs include a variety of ways to assist teachers. Common features of the programs are demonstration lessons that help expand teachers' understanding of pedagogical processes appropriate for teaching the U.S. Constitution and the legal system; creation of instructional materials for use in the classroom with students; and support for teachers as they translate essential content into classroom experiences for students.

Each of these programs is accompanied by well-developed student materials that are designed to engage students through interactive, hands-on lessons. The materials are designed to challenge students with "real-world problems" that are relevant to students today. The content of these programs aligns with national standards in the social studies and is intended to provide meaningful, relevant, and interesting issues for study.

Teachers benefit from well-developed instructional materials and staff development that helps them understand the appropriate instructional processes and content and develop their own units of study. The combination of staff development and curriculum materials facilitates teachers' ability to transfer new strategies and content into the classroom.

Project Legal, We the People ... The Citizen and the Constitution, and We the People ... Project Citizen promote challenging and thought-provoking experiences for students through strategies such as research, small group work, problem-solving, and simulations to construct an in-depth understanding of issues and processes that are directly related to the world beyond the classroom. And teachers benefit from staff development that challenges their understanding of social studies concepts and appropriate pedagogical processes.

Project Legal

Program Description

Content

- legal system
- constitutional law
- case-study methodology
- problem-solving skills
- critical thinking skills
- use of technology to enhance instruction

Project Legal is a law-related education program for those grades that include U.S. history (most often 5, 8, and 11). It focuses on extending teachers' knowledge of the constitutional basis of the legal system and use of problem-solving and the case-study instructional methodology. The cases that students analyze are drawn from significant Supreme Court cases of interest to adolescents. Recognizing that more traditional teaching approaches have failed to improve students' knowledge of the U.S. legal/judicial system, Project Legal provides teacher training, design a more systematic approach to law and civic education, and increase students' problem-solving and critical thinking skills.

The program provides teacher training, curriculum, internet-based instructional materials, and student assessments to support the implementation of developmentally appropriate case-study learning experiences. The program is structured around two key components. First is an introductory unit of ten lessons to develop students' knowledge about (1) how the law relates to them and (2) the concept of legal values conflicts. The second component is biweekly lessons that are incorporated into existing social studies curriculum to reinforce and extend problem-solving skills and legal knowledge.

Context

- wide range of states, districts, and schools
- diverse ability levels
- urban, suburban, and rural schools

Program Context

Project Legal is currently used in more than 1,000 schools in 33 states with students of all ability levels, including special education and gifted students. Urban, suburban, and rural schools have implemented the program with similar success.

Staff Development Program

The staff development component of Project Legal consists of a minimum of a one- to three-day initial training session that immerses teachers in case-study, problem-solving situations in which they are the learners applying the strategies and techniques they are learning. Teachers not only engage in the learning strategies, but also develop approaches for infusing the new strategies into their classrooms by developing lessons and units to take back to their schools and share with their colleagues. Attention to transferring the learning from the workshop setting to the classroom facilitates teachers' use of the new instructional strategies and builds their confidence to do so.

Process

- training
- demonstration
- electronic and phone support
- simulations

The goals of Project Legal that directly impact classroom practices and student achievement are to improve curriculum related to the U.S. Constitution and legal conflicts, strengthen and increase the use of problem-solving and critical thinking strategies, and use case-study instructional strategies.

The goals of the teacher workshop are to: advance teachers' knowledge of law and critical thinking skills; update teachers on landmark U.S. Supreme Court decisions; teach the case-study method of instruction; coordinate K-12 education; and share resources related to new social studies content standards and instructional methods. Participants have ongoing support via telephone and internet consultation with the Project Legal staff and other social studies teachers who are implementing the program.

Intended Audience

- individual volunteer teachers
- entire department or team

Summary of Results

Students in Project Legal classrooms in grades 5, 8, and 11 significantly improved their knowledge and comprehension of law-related curriculum and their problem-solving skills related to functioning in the U.S. legal/judicial system when compared to students in traditional U.S. history classrooms.

Evidence of Increased Student Achievement

Success Indicators

- criterion-referenced tests of knowledge and comprehension of legal issues and problem-solving skills related to legal issues

Project Legal's first evaluation was conducted during the 1978-1979 school year, and subsequent evaluations have supported the initial findings. The original study (1979) and subsequent ones (1982 and 1995) used a pre- and post-test control and treatment group design. Students who participated in Project Legal classrooms performed significantly better than those who had more traditional social studies curriculum and instruction.

Criterion-referenced assessments of students' law-related knowledge and comprehension (KCL) and problem-solving skills in law (PSL) were designed by the program developers to measure the program's effectiveness. The original study involved 1,718 students in New York state in diverse school settings whose teachers were randomly assigned to implement either Project Legal or traditional instructional approaches. The random assignment of teachers and classrooms to treatment and control groups strengthens the findings of the program evaluation. A more recent study involved three geographically diverse settings (NJ, OK, NY). As in the previous studies, fifth-, eighth-, and eleventh-graders in Project Legal classrooms scored significantly better ($p<.01$) in knowledge and comprehension of legal issues and in problem-solving related to legal issues.

Social Studies

THE BOTTOM LINE

This social studies program involves students in case-based constitutional law that engages them because the issues are relevant to adolescents. It integrates the use of technology into the curriculum to enhance students' learning. Students who have engaged in Project Legal have demonstrated increased understanding of the U.S. Constitution and critical thinking. The staff development component helps teachers identify cases for discussion, strengthens their understanding of constitutional law, and develops their ability to use case-study, problem-based instructional strategies.

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We the People ... The Citizen and the Constitution

Program Description

Content

- critical thinking skills
- problem-solving skills
- instructional strategies
- U.S. Constitution
- Bill of Rights
- constitutional democracy

We the People ... The Citizen and the Constitution enhances students' understanding of the American constitutional democracy and the contemporary relevance of the Bill of Rights. The middle school version is intended for use by students in grades 6-9. The student textbooks may be used with students of all ability levels and may be used either as supplemental material or as a replacement to the social studies curriculum. Students demonstrate their knowledge and understanding of constitutional principles and evaluate, take, and defend positions on relevant historical and contemporary issues.

The staff development program focuses on developing teachers' knowledge about the U.S. Constitution and the Bill of Rights. In addition, teachers learn instructional strategies for teaching key concepts and thinking skills. The pro- gram includes critical thinking skills, problem-solving activities, and cooperative learning, all designed to develop students' intellectual and participatory skills in addition to increasing their understanding of the institutions of U.S. constitutional democracy. In the culminating activity, a simulated congressional hearing, students "testify" before a panel of judges.

Social Studies

Program Context

Context

- wide range of U.S. territories, states, districts, and schools
- students of diverse abilities

The program has been widely replicated throughout the U.S. and four of the U.S. territories. With money set aside by Congress, each congressional district is entitled to a certain number of classroom sets of *We the People ... The Citizen and the Constitution* without charge. Additional materials are available at a limited cost. The intention is to keep the costs low so that more schools will be able to implement the program.

Staff Development Program

Program designers acknowledge the importance of the staff development program in easing the implementation of the program in the classroom. Well-developed curriculum materials for students are combined with staff development for teachers to increase students' understanding of constitutional democracy. Teacher training is intended to familiarize teachers with the rationale, goals, objectives, content, and methods of the instructional program. The teacher training for this program has four components: (1) building familiarity with the instructional materials and implementation processes of the program; 2) conducting the culminating activity, which is the competitive or non-competitive congressional hearings; (3) informing educators about substantive changes in perception of and knowledge about the U.S. Constitution; and (4) reviewing instructional methods needed to implement We the People ... The Citizen and the Constitution.

Staff development for teachers who wish to implement the program occurs in several ways. Summer week-long institutes are taught by constitutional scholars from several fields, social studies teacher educators, and teachers. Institutes are held on university campuses in several locations. In addition to summer institutes, state coordinators provide training and assistance to support implementation in classrooms throughout the state. Training varies according to the needs of participants. A training manual for state coordinators adds consistency to the dissemination of the program throughout the 50 states and several U. S. territories.

Process

- week-long summer institutes
- training
- discussions
- demonstrations
- conferences
- ongoing support

Intended Audience

- entire department or team
- individual volunteer teachers

Summary of Results

We the People ... the Citizen and the Constitution depends on well-designed instructional materials, curriculum, and staff development for its success in increasing student achievement.

Evidence of Increased Student Achievement

In a 1991 Educational Testing Service evaluation of We the People ... The Citizen and the Constitution, middle school students who participated in the program scored significantly better ($p<.01$) on a test of knowledge of the history and principles of the U. S. Constitution than did students who participated in a regular constitutional instruction program. These results were consistent with results achieved in prior studies in 1988 and 1990 of a matched group post-test-only study of 420 participating eighth-grade students and 424 non-participating eighth-grade students in one school district in Texas. The test was developed by the Center for Civic Education to align with the content of We the People ... The Citizen and the Constitution. Students in this program scored significantly better ($p<.01$) on each of six curricular unit tests than did comparison groups studying similar topics. Units included political philosophy; history and experience; issues and debates at Phila-delphia; establishment of the government; and basic rights and responsibilities of the citizen.

Success Indicators

- tests of knowledge of constitutional history
- test of principles of the U.S. Constitution
- simulated congressional hearing

Evidence from this assessment of middle grade students is consistent with assessments done of students participating in the elementary and high school versions of We the People ... The Citizen and the Constitution. In a 1994 study, the Council for Basic Education concluded that the culminating activity of a simulated congressional hearing was a model of performance assessment. We the People ... The Citizen and the Constitution was approved for dissemination by the Program Effectiveness Panel of the National Diffusion Network.

Social Studies

THE BOTTOM LINE

✪ ✪ ✪

We the People ... The Citizen and the Constitution has a positive impact on students' civic knowledge and attitudes. It is primarily a curriculum program that supports increased student learning about the U.S. Constitution and the Bill of Rights. However, program developers and state coordinators realize the importance of staff development to support the implementation of this social studies program. Teachers report that staff development has given them skills to be excited and renewed, and that students are enthusiastic about what they have accomplished, especially in terms of their ability to carry out a reasoned argument.

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We the People ... Project Citizen

Program Description

Content

- local and state government
- U.S. history
- principles of the U.S. Constitution
- civic participation

We the People ... Project Citizen is a portfolio-based civics education project for middle grade students in grades 6-9. It focuses on promoting an understanding of the U.S. Constitution as well as responsible participation in state and local government. Project Citizen actively engages students in learning how to monitor and influence public policy, and advocates civic participation of students, their parents, and members of the community. The project is funded by the U.S. Department of Education.

We the People ... Project Citizen combines well-developed curriculum materials for students with staff development for teachers to increase students' understanding of the role of state and local governments in the American federal system. Teachers learn to provide a series of structured, cooperative learning activities that help students to interact with their government in a five-step process that includes: (1) identifying a public policy problem in their community; (2) gathering and evaluating information on the problem; (3) examining and evaluating solutions; (4) selecting or developing a proposed public policy; and (5) developing a plan of action. The program has been expanded to allow for the possibility of implementing action plans.

In addition to classroom activities, as a culminating activity, students participate in simulated legislative hearings before a panel of community representatives who act as legislative committee members.

Program Context

Context

- wide range of state, district, and school settings
- students of diverse abilities, primarily 7th and 8th grade students
- sometimes used as an extracurricular activity

Since 1995-96, 1,800 teachers in all 50 states and Washington, D.C., haveused Project Citizen. Over 30,000 students have participated in Project Citizen. Most students were in grades 7 and 8. Project Citizen can be adapted for a wide range of student ability levels from special education to gifted classes. It is appropriate for grade levels 6-9. In some cases, Project Citizen is used as an extracurricular program.

Staff Development Program

As We the People ... Project Citizen has matured, the staff development program has grown more consistent. The training is usually conducted by state coordinators who are responsible for distributing materials and providing leadership for statewide use. Most state coordinators are classroom teachers who serve in the capacity of trainer.

An extensive professional development manual includes demonstration lessons that may be used in the training or in classrooms with students. The focus of the training is on (1) understanding the content and structure of We the People ... Project Citizen; (2) assessing student portfolios and oral presentations; (3) using instructional strategies appropriate to the program; and (4) demonstrating and debriefing sample lessons.

Training approaches vary widely, from one-hour presentations to comprehensive and substantive sessions that focus on transforming the classroom into an interactive environment that engages students in "real" issues. Regardless of the type of training, follow-up is essential to ensure implementation and is supported by a network of state leaders and teachers.

The most valuable training for teachers includes a step-by-step review of the Project Citizen materials, examination of student and class portfolios, discussions of ways to integrate Project Citizen into the existing curriculum and classroom, demonstrations of Project Citizen lessons, and hands-on opportunities for teachers to engage in the experience as both teachers and students.

Process

- review of program materials
- analysis of student portfolios
- curriculum redesign
- demonstration lessons
- support from state coordinators

Intended Audience

- individual volunteer teachers
- entire department or team

Social Studies

Summary of Results

We the People ... Project Citizen's success depends on well-designed materials, curriculum, and staff development to improve student achievement.

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Evidence of Increased Student Achievement

Success Indicators

- civic involvement
- knowledge of history
- knowledge of principles of the U.S. Constitution

We the People ... Project Citizen has been evaluated in a number of studies. In a 1991 evaluation, middle school students who participated in the program scored significantly better ($p<.01$) on a test of knowledge of the history and principles of U. S. Constitution than did students who participated in their regular constitutional instruction program. In 1997-98, the University of Texas, Austin, Lyndon B. Johnson School of Public Affairs conducted an extensive assessment of We the People ... Project Citizen.

Specifically, the assessment revealed that:

1. Students using Project Citizen believe they can make a difference in their communities.
2. Students using Project Citizen do make a difference in their communities.
3. Students and teachers believe Project Citizen helps students develop a greater understanding of public policy and the challenges of policy makers.
4. Students and teachers believe Project Citizen helps students learn how their government works and develops commitment to active citizenship and governance.
5. Students and teachers believe Project Citizen involves students in their communities and helps students learn about specific community problems.
6. Students and teachers believe Project Citizen encourages students to work in groups.
7. Students and teachers believe Project Citizen teaches students important communication skills.
8. Students and teachers believe Project Citizen teaches students important research skills.
9. Students enjoy Project Citizen.

Social Studies

THE BOTTOM LINE

We the People ... Project Citizen has improved students' knowledge and understanding of the active citizenship and public policy. While primarily a curriculum project, the staff development program is expanding to facilitate implementation of the content and instructional strategies that engage young adolescents in authentic work within their community. The evidence strongly supports the effectiveness of Project Citizen as a program that is developmentally appropriate for middle-level students.

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DOCUMENTATION

Lyndon B. Johnson School of Public Affairs. (1998). *An Assessment of We the People ... Project Citizen: Promoting Citizenship in Classrooms and Communities.* The University of Texas at Austin Policy Research Project Report #129.

Standards for Social Studies

National Council for the Social Studies, 1994

Social studies programs should include experiences that provide for the study of:

1. **Culture and Cultural Diversity**
   How human beings create, learn, and adapt culture

2. **Time, Continuity, and Change**
   The ways human beings view themselves in and over time

3. **People, Places, and Environments**
   Understanding of spatial views and geographic perspectives of the world

4. **Individual Development and Identity**
   How personal identity is shaped by one's culture, groups, and institutional influences

5. **Interactions Among Individuals, Groups, and Institutions**
   How institutions influence human beings

6. **Power, Authority, and Governance**
   How people create and change structures of power, authority, and governance

7. **Production, Distribution, and Consumption**
   How people organize for the production, distribution, and consumption of goods and services

8. **Relationships Among Science, Technology, and Society**
   The role and influence of science and technology in society

9. **Global Connections and Interdependence**
   Understanding of the important and diverse global connections among world societies

10. **Civic Ideals and Practices**
    The ideals, principles, and practices of citizenship in a democratic republic

Table 5: Standards for Social Studies

Ideal programs promote or develop the following standards:

	Project Legal	We the People The Citizen & the Constitution	We the People Project Citizen *	
• Social studies programs should include experiences that provide for the study of culture and cultural diversity.	X	X		
• Social studies programs should include experiences that provide for the study of the ways human beings view themselves in and over time.	X	X		
• Social studies programs should include experiences that provide for the study of people, places, and environments.				
• Social studies programs should include experiences that provide for the study of individual development and identity.	X	X		
• Social studies programs should include experiences that provide for the study of interactions among individuals, groups, and institutions.	X	X	X	
• Social studies programs should include experiences that provide for the study of how people create and change structures of power, authority, and governance.	X	X	X	
• Social studies programs should include experiences that provide for the study of how people organize for the production, distribution, and consumption of goods and services.	X			

Table 5: Standards for Social Studies

Ideal programs promote or develop the following standards:	Project Legal	We the People The Citizen & the Constitution	We the People Project Citizen ⁂	
• Social studies programs should include experiences that provide for the study or relationships among science, technology, and society.	X			
• Social studies programs should include experiences that provide for the study of global connections and interdependence.	X	X	X	
• Social studies programs should include experiences that provide for the study of the ideals, principles, and practices of citizenship in a democratic republic.				

⁂ Teachers select the content and standards to address in their classes. As a result, this program may meet more standards than indicated here.

Interdisciplinary Program Abstracts

Expeditionary Learning Outward Bound. 158

The Fernwood Project: HIV Prevention for America's Youth. 162

Project CRISS 166

Reading Power in the Content Areas 170

Results-
Staff
Middle Grades

Increasing
Achievement
Through Learning

Interdisciplinary

Overview
Interdisciplinary Staff Development Programs

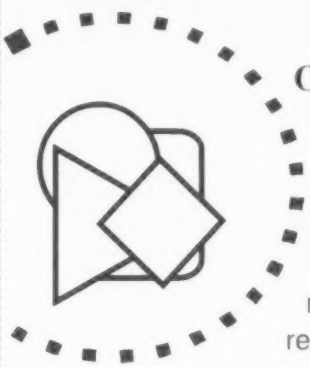
Joellen Killion, Project Director, Results-Based Development for the Middle Grades

The interdisciplinary programs included in this section cross the boundaries of the individual disciplines. Expeditionary Learning Outward Bound (ELOB), Project CRISS, and Reading Power in the Content Areas address more than one disciplinary area. CRISS and Reading Power in the Content Areas are reading-across-the-content-areas programs that are designed to build students' reading skills in all subject areas. The Fernwood Project: HIV Prevention for America's Youth combines issues important in science and the social studies.

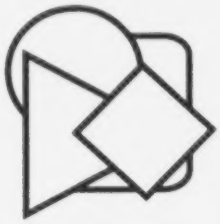
In the middle grades, students need challenging, integrated learning experiences to develop a deeper understanding of individual curricular areas. They especially need opportunities to apply processes from the language arts to other content areas. Both CRISS and Reading Power in the Content Areas give teachers new instructional strategies to help students acquire new information and make sense of new content, regardless of academic area.

The Fernwood Project integrates science, health, and social studies into the study of HIV. This unique program addresses a critical and complex social issue. During staff development, teachers gain knowledge and instructional strategies appropriate for teaching sensitive issues in the middle grades, and they receive ongoing help to implement the program.

Expeditionary Learning Outward Bound (ELOB) is included in the interdisciplinary section because it incorporates extending teachers' content knowledge and pedagogical processes in all disciplines. The expeditions that guide students' learning experiences are multidisciplinary learning experiences. Teachers work across all disciplines to design expeditions and build students' understanding of subject areas in rich, authentic experiences.



Over multiple years, each of these interdisciplinary programs has increased student achievement in at least one of the subject areas it incorporates and can be replicated. In the staff development associated with these programs, teachers increase their understanding of the reading and writing processes. They also gain tools and strategies to use in their classrooms to increase student achievement. Equally important, when they return to their classrooms, they receive ongoing support.



Expeditionary Learning Outward Bound

Program Description

Content

- core ELOB practices
- designing expeditions
- assessment practices
- changing role of the teacher
- engaging students in learning
- instructional strategies
- literacy platform

Expeditionary Learning Outward Bound (ELOB) is a school reform program that incorporates extensive content-based staff development. Students' educational experiences revolve around expeditions — long-term, in-depth studies of a topic or theme that involve field work, service, adventure, and a cumulative final project or performance.

Teachers, who are at the center of the learning experiences, must know their content deeply and be able to transform their teaching practices so that they can design and guide expeditions. Ten design principles and five program core practices characterize each of the 65 ELOB schools. The ten principles include an emphasis on character and academic development; social commitment, vision, and service; cooperation and healthy competitions against oneself and standards; the importance of caring and intimacy, solitude and reflection and success and failure as means to and conditions for learning; respect for nature and the environment; diversity and inclusivity in the classroom; and creation of conditions in schools for all students to discover and construct meaning. ELOB schools restructure schedules, school organization, teacher-student relationships, curriculum, professional development, and assessment to create and support a community of learners engaged in expeditions.

Context

- diverse school sites, including urban, suburban, and rural schools
- range of grade configurations
- diverse student populations, including high populations of minority and low-income students

Program Context

Expeditionary Learning Outward Bound is implemented at diverse school sites, including schools in urban, suburban, and rural settings. It is effective in a wide range of grade configurations including K-6, K-8, K-12, 6-12, and 9-12. ELOB schools include diverse student populations that frequently are composed of high populations of minority and low-income students.

Interdisciplinary

Staff Development Program

The staff development program associated with Expeditionary Learning Outward Bound is experiential and extensive. Its goal is changing teachers' views of teaching and their role in the classroom and helping them become facilitators of learning rather than dispensers of knowledge.

The staff development program includes multiple dimensions. During five-day summer planning institutes, national faculty works with teams of teachers in developing their expeditions. On-site professional development occurs after school or on planning days. On these days, national faculty help teachers align their expeditions to state standards, assist with identifying additional resources and materials, and help design concrete lessons. Additional training during the school year might include using portfolios or creating rubrics and other forms of authentic assessment. National leadership institutes focus on assessing a school's readiness to implement Expeditionary Learning. National leadership retreats and conferences are held annually and promote collaboration. Week-long summits provide immersion in a discipline or topic.

Other forms of staff development include sharing days where teachers network with colleagues; visits from master teachers; workshops on special topics; visits to schools with the ELOB network; leadership development forums for principals and other school leaders; and Outward Bound expeditions designed for educators. Most teachers participate in an average of 10-20 days of professional development a year. Summer institutes, sharing days, planning days, and mini-sabbaticals are the most frequent forms of ELOB staff development.

Process

- training
- coaching
- demonstrations
- action research
- school self-study
- school visitations
- periodic peer review

Intended Audience

- entire school

Summary of Results

Students' academic achievement in math and reading on standardized, norm-referenced, achievement tests increased significantly as a result of their participation in ELOB when compared to other schools in the states and/or districts. In addition, students' attendance, parent involvement, attitude about school, enjoyment of school, and active engagement in learning increase as a result of the expeditionary structure of learning.

Interdisciplinary

Evidence of Increased Student Achievement

Success Indicators

- state assessments
- norm-referenced tests in reading and mathematics

Students in Expeditionary Learning Outward Bound schools not only performed better academically, but also socially. To determine how students advanced academically, a complex evaluation system was conducted by the Academy for Educational Development. Data from two cohorts of students (1993-1995) were collected and analyzed separately and collectively. Cohort A students are those who were enrolled for two years in an ELOB school and received two years of ELOB instruction. Students in Cohort B received one year of ELOB instruction. Students in both cohorts showed significant gains on standardized assessments in reading and mathematics.

Particularly notable in three schools was the increase of students in the top two quartiles and the decrease of students in the bottom quartile. From 1993-95, selected grades in selected schools showed significant gains in reading: grades 5-6 in a K-8 school; grade six in two elementary schools; grade seven in two middle schools; and grade eight in one middle school. In math, in selected grades and selected schools the results are similar: grades 5-6 in a K-8 school; grade 9 in a middle school; and grade 6 in two elementary schools. In a middle school in Maine, student scores increased 45 points in reading and 65 points in math on the Maine Educational Assessment, compared to statewide gains of 5 points in reading and 25 points in math. Individual school performances in Georgia, Iowa, and Massachusetts showed similar significant gain in reading and math scores. Other evident gains were in attendance, student enjoyment of school, active engagement, and parent involvement.

THE BOTTOM LINE

Expeditionary Learning Outward Bound, a comprehensive school reform model, is included because it incorporates extensive content-specific staff development. The integrated approach to teaching and learning required teachers to have deep content knowledge in order to develop high quality interdisciplinary learning experiences for students. Teachers not only learn to structure the learning environment differently, but they also learn to structure their teaching and content differently to engage students in authentic learning experiences in where they are primarily responsible for their own learning.

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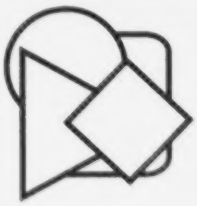
Academy of Educational Advancement, Inc. (1996). *Expeditionary Learning Outward Bound: Summary Report.* New York: Author.

Expeditionary Learning Outward Bound: A Design for Comprehensive School Reform. Cambridge, MA: Author.

Udall, D. & Rugen, L. (1997, January). From the inside out: the expeditionary learning process of teacher change. *Phi Delta Kappan, 78,* 404-408.



The Fernwood Project:
HIV Prevention for America's Youth

Content

- knowledge about HIV
- discussing sensitive topics with students and their parents
- handling students' discomfort with sensitive topics
- building teachers' confidence and comfort with sensitive topics
- working with parents and community to protect young adolescents

Context

- diverse school settings
- support from school district and local community
- parental involvement and support
- support and involvement from other staff, nurses, counselors, and community agencies

Program Description

The Fernwood Project: HIV Prevention for America's Youth is a middle school (grades 6-8) HIV education program developed and conducted by Redefining Actions and Decisions (RAD) with support from the Pediatric AIDS Foundation. It was field-tested in four diverse communities. It provides a sound curriculum (including information on risk elimination — i.e. abstinence — and risk reduction) and staff development for teachers. The program's goal is to educate students about how to protect themselves against HIV infection by using an age-appropriate, interactive curriculum.

Training increases teachers' knowledge about HIV, and their skills, confidence, and comfort with classroom discussion of sensitive topics. Program developers contend, and evaluation data support, that teachers' comfort is contagious and an outcome of the program's success would be students' increased comfort level in talking to peers, teachers, or parents about HIV-related issues.

The program fosters community involvement and strong commitment from the school administration. Parents and community members may preview the lessons and curriculum prior to students' engagement with it. The program develops middle school students' knowledge about HIV and impacts their ability to make responsible and healthy life choices.

Program Context

The four sites where The Fernwood Project was implemented were demographically diverse. Three school districts were urban, one rural; three had substantial or predominant Hispanic student populations; and three describe themselves as serving socially conservative communities. Two were pedagogically conservative. Other distinct features of the schools included the invol-vement and concerns of the leadership and existing health instruction at the middle grades. Whether teachers were recruited to participate in training and pilot activities or volunteered also was significant.

Interdisciplinary

Staff Development Program

The staff development program involved a two-day teacher training which occurred during the school day on release time. It included teachers in grades 6-8 and others such as primary teachers, nurses, counselors, community health educators, and parents. Community members also attended the training. Training was conducted by Redefining Actions and Decisions (RAD) trainers.

A staff member from each school helped with logistical arrangements, data collection, and parent communication. The training focused on helping teachers feel comfortable with a more interactive and experiential approach to teaching about HIV/AIDS. While teachers initially expressed apprehension about teaching sensitive topics to young adolescents, they found that the training and their experience in teaching the program made them more confident.

During the training, teachers had opportunities to consider and examine the curriculum, explore their own feelings about teaching sensitive topics, and participate in decisions about which units they would teach as part of the program. Following training, teachers were given support both by their local school and district personnel, and also by the Redefining Actions and Decisions staff.

Process

- training
- modeling
- demonstration
- curriculum design
- follow-up support

Intended Audience

- entire school
- entire department
- individual teachers with school, district, and community support

Summary of Results

"By all measures the Fernwood Project arguably qualifies as a success. Although not perfect, when considered across all data types, the data reveal a program that met its demanding goals: teachers were able to learn a new, dynamic [way] to approaching HIV education; communities could accept it as a viable approach; and, most importantly, students could learn and retain critical information regarding their risks of HIV infection and ways through which they can avoid infections" (Brett, et al, 1998).

Evidence of Increased Student Achievement

Success Indicators

- Center for Disease Control tests
  - knowledge test
  - attitude survey
  - behavioral and perception battery
- teacher surveys
- teacher and community focus groups

The comprehensive evaluation of The Fernwood Project involved assessment of teachers, community, and student outcomes. Student outcomes were measured on questionnaires developed by the Center for Disease Control, addressing knowledge, attitudes, behavior/behavioral intentions, perceptions about peers' behaviors, interactions with teachers and peers, and sources of information about HIV/AIDS. Other general data about students were collected via surveys and focus groups.

Students showed significant gains from pre-test to post-test on many measures and maintained the gains through a three-month delayed post-test. Students in both grades demonstrated increased, broadened, and more complex understanding of the HIV-related issues. There were often highly significant, desirable, and sustained changes in knowledge at both grade levels. Students at both grade levels reported high levels of satisfaction with The Fernwood Project. More than 80 percent of students in both grades indicated that their teachers "seemed comfortable during the sessions."

It is notable that both student and teacher gains occurred in a climate not marked by the usual hostility, fear, and frustration associated with implementing HIV education. Students, as well as their teachers, administrators, and parents expressed considerable enthusiasm for the Fernwood Project process and activities.

THE BOTTOM LINE

The Fernwood Project: HIV Prevention for America's Youth is unique in a number of ways. It acknowledges the important influence teachers' comfort with content has on students' comfort in the learning environment. It also employs a comprehensive evaluation process to explore various ways teacher and curriculum enhancement affect students, their teachers, and the community. This program has confirmed that where community concerns are addressed and administrative support is earned, middle school teachers can be trained to use a brief, pedagogically challenging, highly explicit curriculum with middle school students and win the support of their communities while achieving significant results with both students and teachers.

Interdisciplinary

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Documentation

Brett, J., Pownell, S. & Stone, T. (1998). *The Fernwood Project: Final Report on Statistical Data.* Denver, CO: Author.

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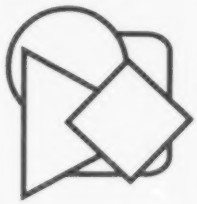

Project CRISS:
Reading, Writing, and Studying Strategies for Literature and Content

Program Description

Content

- instructional strategies for integrating reading and learning skills
- interacting with text
- patterns and structures of text
- learning processes
- writing to learn

An interdisciplinary program, CRISS stands for **CR**eating **I**ndependence through **S**tudent-owned **S**trategies: Reading, Writing, and Studying Strategies for Literature and Content. Basically, it focuses on helping students in grades 4-12 read, understand, organize, and study material to facilitate their learning. Based on principles from cognitive psychology and reading, the program builds on the theoretical premises that students must integrate new information with prior knowledge and be actively involved in their own learning. The strategies were originally developed to enhance students' reading and writing skills but have application in all content areas. This makes Project CRISS an excellent program to use in the interdisciplinary framework of a middle school and to apply its learning strategies throughout a broad curriculum.

The program was developed in 1979 yet continues to be revised to incorporate new techniques and to reflect new research about learning processes. Project CRISS was approved as a National Diffusion Network program in 1981, 1985, and 1993.

Program Context

Context

- varied schools and districts including urban, suburban, and rural
- varied student populations
- grade levels 4-12, all content areas

CRISS has been implemented in schools throughout the country with similar success. The program addresses the needs of diverse student populations including Title I, ESL, special education, gifted and talented, and regular education. The program has been implemented in a wide variety of schools.

Interdisciplinary

Staff Development Program

The CRISS 12-18 hour staff development program prepares teachers to implement Project CRISS instructional strategies in their respective content areas. The workshop includes sessions for each of the seven components of the program: theoretical background; textbook analysis and teaching the author's craft; discussion strategies; active strategies for learning and organizing; writing strategies; vocabulary; and assessment.

Within the staff development program, teachers have opportunities to see models of the teaching strategies in action and learn how to apply those strategies in their own classrooms. Teachers learn to demonstrate how to interact with text, understand patterns and structures, have productive discussions, engage actively in the learning process, organize for learning, write to learn, write reports and essays, and learn new vocabulary. Teachers learn to use CRISS strategies to assess students' progress and to help students learn to assess their own work.

Participants in the Project CRISS training receive a teacher resource guide that assists them in implementing the strategies using their content-area textbooks. The staff development explains the learning strategies and suggests ways to apply the strategies in various content areas. In addition, teachers work with their own content materials throughout the training to apply the strategies and to create instructional tools to use in their classrooms.

Project developers advocate continuous follow-up. A follow-up meeting takes place three to six months after the initial training. In addition, a district facilitator supports teachers, helps collect data to evaluate the program's effectiveness, and serves as a liaison between the program staff and the local school or district.

Process

- training
- modeling
- demonstration
- development of instructional materials
- follow-up support
- local facilitator

Intended Audience

- entire school
- entire department or team

Summary of Results

Students at all three evaluation sites outperformed the non-treatment group at significant levels even when accounting for naturally occurring gains of students. At the middle school level, students in the treatment group recalled more than twice as much content-area knowledge as their comparison groups.

Interdisciplinary

Evidence of Increased Student Achievement

Success Indicators

- free-recall of content area reading material

Students who were taught Project CRISS strategies demonstrated significantly greater gains ($p < .001$) in the retention of subject-specific information than comparable students who did not participate in the program. The evaluation of Project CRISS was conducted in 1991-92 with eight pre- and post-comparison groups at the development site and two replication sites (Montana, Florida, and Virginia) using intact classroom groups of students in grades 4, 6, 8, and 11. Teachers, rather than students, were randomly assigned to the treatment and comparison groups.

Information retention was assessed through a standardized free-recall approach using text appropriate to the reading level of the students. Both pre- and post-test data were collected using procedures that closely resembled actual classroom and learning situations. Measures to ensure reliability of the process were employed. Data were then analyzed using statistical processes to explore differing effects of the implementation of Project CRISS across both the pre- and post-tests. Students at all three sites outperformed the non-treatment group at significant levels even when accounting for naturally occurring gains of students. In subsequent studies in 1994-95, similar results occurred in two other sites (Colorado and Washington).

THE BOTTOM LINE

When students need help with reading in the content area, organizing information to improve learning, and strategies for studying and processing new information, CRISS will help. For teachers of all content areas this program has been beneficial. And, when teachers in interdisciplinary teams use similar learning strategies across content areas, students' application of the skills is reinforced and their learning increases.

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Interdisciplinary

Reading Power in the Content Areas

Program Description

Content

- reading skills
- strategies for integrating reading across the curriculum
- reading assessment strategies
- vocabulary skills
- direct instruction
- comprehension
- critical reading skills

Reading Power in the Content Areas is a staff development program for teachers in grades 6-12 designed to assist teachers in integrating reading skills and strategies into their classroom instruction. The program is based on the assumption that when teachers integrate reading skills and strategies across the curriculum and in all content areas, students will not only improve their reading ability, but also will increase their success in the content areas.

Most content-area teachers receive little preparation in teaching reading, and most middle grade students need continued instruction in reading. Because content-area textbooks are often challenging for students to read, middle grade teachers in all content areas need a repertoire of strategies to help students learn and apply reading strategies to enable them to use their textbooks in all content areas as an information source.

Reading Power in the Content Areas helps middle grades teachers gain knowledge and skills to assess students' reading skills; integrate speaking, listening, reading, and writing into all content areas; develop instructional tools to use with students; and teach comprehension strategies, word skills, study skills, and critical reading skills.

The program was developed in 1972, approved for dissemination by the National Diffusion Network in 1974, and reauthorized by the U.S. Department of Education in 1994 for use in grades 6-12.

Context

- diverse school settings, including urban, suburban, and rural
- diverse student populations

Program Context

Reading Power in the Content Areas has been implemented in numerous and diverse schools and districts throughout the country. Designed originally as a high school program, it is now available for grades 6-12. The program has been successfully used in a very diverse school setting with a wide range of students, including at-risk, low-income, and minority students.

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Staff Development Program

The initial staff development includes a one- or two-day workshop. During the workshop, teachers learn reading concepts and strategies, assessment techniques, and instructional strategies related to integrating reading, writing, speaking, listening, and thinking in all content areas. Specific instructional strategies help teachers teach vocabulary, comprehension, critical reading and thinking skills, study skills, organization, and test-taking skills.

Beyond the initial training, ongoing staff development activities are jointly planned and conducted on-site by the project coordinator and local coordinator. The focus of these activities is to support and monitor implementation. On-site follow-up is provided six to eight months following the initial training by project staff. An implementation checklist guides the local coordinator in monitoring ongoing implementation and serves as a self-monitoring tool for teachers. In addition, a local coordinator serves as a coach for teachers to support the transfer of new skills into the classroom.

Training is provided by the program developer or certified trainers who have experience using Reading Power in the Content Areas in their own classrooms. The training engages participants in cooperative and collaborative activities and allows time for designing appropriate instructional materials for the classrooms.

Process

- training
- demonstrations
- modeling
- follow-up including electronic support, additional training, group meetings, and coaching

Intended Audience

- entire school
- entire department or team
- individual teachers

Summary of Results

Reading Power in the Content Areas provides teachers with the knowledge, strategies, and skills to improve students' learning in all content areas by helping students learn and apply reading strategies to acquire and process information. Students' achievement in reading, as measured on a norm-referenced test, increased significantly within a single school year.

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Evidence of Increased Student Achievement

Success Indicators

- norm-referenced test
- district-level test

Reading Power in the Content Areas was originally designed as a 9th-12th grade program and adapted for grades 4-8. It has been implemented in diverse sites within the United States and its territories. Original evidence of effectiveness was collected in grades 9-12. In 1994, the primary site for middle school implementation was Lanai, Hawaii.

The overall effectiveness of Reading Power in the Content Areas in the middle grades was determined through the use of a pre-and post-norm-referenced test comparison. The national norm group served as the control group. Annual test score data and NCE scores were used for all analyses. The NCE gain of 11.9 for the Lanai, Hawaii, 208 eighth-grade students on the Gates-MacGinite total reading battery was significant at .05. Similar results were found for students in grades 9-12 in three other districts in the United States.

At a California middle school, eighth-grade students advanced more than 8 standard scores (RIT) in a single year on the Sacramento Achievement Levels Test (SALT). This gain shows two years' improvement in one calendar year, which is well above the expected standard score gain of 4 for one year's growth.

THE BOTTOM LINE

Reading is an essential learning process for students in all content areas. Reading Power in the Content Areas helps teachers acquire the necessary knowledge, skills, and strategies to improve students' ability to read content-area texts by actively interacting with the text. Students' reading achievement increases and students gain strategies to construct meaning from text.

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Sample Sites

✓ Central Middle School and Kenneth Cooper Middle School
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fax: 405-491-7514
e-mail: pcenzl@ionet.net
web site: unavailable

✓ Will C. Wood Middle School
Frank Lewallen
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fax: 916-382-5914
e-mail: unavailable
web site: unavailable

✓ Manhattan High School
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Web site: unavailable

Documentation

National Diffusion Network. (1996). *Educational Programs That Work: The Catalogue of the National Diffusion Newtwork.* Longmont, CO: Sopris West.

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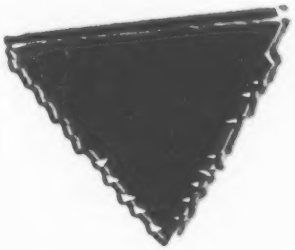

Part Three

Achieving Results

Common Characteristics of Programs in the Guide

Results-Based Staff Development for the Middle Grades is a timely and important initiative. Today many professional associations, federal and private agencies, and educational organizations are actively striving to upgrade teachers' preparation and to increase their opportunities for ongoing development. The National Staff Development Council is on the leading edge of these reform efforts.

Results-Based Staff Development for the Middle Grades is making a unique contribution to the baseline information about the state of staff development in the content areas. This initiative has established essential criteria for evaluating staff development programs and has identified 26 programs that meet these stringent criteria. The results of this initiative contribute new information about how staff development is being linked to student achievement. Another important outcome of this work is an understanding of the state of staff development in the content areas.

This chapter identifies conclusions drawn from the similarities that were found in the programs selected for inclusion in this guide. These similarities represent the current staff development practices in the content areas. Examples are provided to demonstrate how these characteristics tend to exist in a variety of programs.

Goals to Improve Student Achievement

Not surprisingly, when a program's goals included increasing student achievement, the program did just that. Most of the programs included in *What Works in the Middle: Results-Based Staff Development* had increasing student achievement as a goal. Most also included goals about increasing teachers' content knowledge and changing teachers' instructional practices to align with standards of reform for the content areas. And, not surprisingly, when programs did not clearly state a goal -- increasing student achievement, for example — they did not!

When a staff development program aims to improve student achievement, most likely the goals will be achieved. In other words, "we get what we want." If, for example, a program focuses on improving teacher behavior or knowledge, that is the result, rather than improvement in student achievement. On the other hand, when programs focus on improving student performance, both student and teacher performance increase.

The lesson learned here is that setting a goal for a staff development initiative, such as "a high percentage of staff members will participate," or "teachers will increase

their content knowledge" or "teachers will change their instructional practices," misses the whole purpose of investing time and financial resources in staff development. Increasing teachers' content knowledge, changing their attitude about their content areas, or expanding their repertoire of instructional practices is a *step* on the path toward the *only result* that matters — increased student achievement.

In their book, *A New Vision for Staff Development*, Sparks & Hirsh (1997) state that results will be achieved when those results are clearly identified, the process for achieving results is well-planned, and the process is implemented in a supportive system. Those who say that staff development cannot be linked to student achievement may not have begun with the intention of improving student learning.

Funding Support

Funding is a commonality among the math and science programs selected for inclusion in *What Works in the Middle: Results-Based Staff Development*. For example, many of the math and science programs were funded through the National Science Foundation teacher enhancement programs, statewide systemic initiatives, or local systemic change initiative grants. This funding provided extensive resources for program design and teacher training, professional release time, teacher leadership stipends, materials, and other costs associated with the programs. With these resources, often many teachers were able to benefit from quality staff development experiences. On the downside, once such funding lapsed, many excellent programs were discontinued. Of the extensive number of math and science programs identified as showing promise for improving student and teacher learning, a number had been discontinued at the end of their funding cycle. Only a few programs, such as Mathematics Renaissance, have been able to sustain program funding beyond their funding cycle.

Dependency on external funding for staff development continues to leave staff development outside the system as an incidental, optional component of the education process, rather than as an embedded, essential part of the educational system. When schools and districts view staff development as an "add-on," it rarely produces long-term results for students or teachers and never receives the systemic support needed to make a wide-ranging impact. In contrast, when staff development is viewed as an investment — similar to the way in which research and development is viewed in other organizations — then it receives the funding and time allocation necessary to support it as an integral component of a successful learning organization.

Training with Modeling

When people think about staff development, the predominant image that comes to mind is the traditional institute day or inservice course. This image held true for

the majority of the programs included in this resource guide. However, training is only one of five models of staff development presented in NSDC's *Standards for Staff Development: Middle Level Edition*. Other models include (1) observation and assessment, (2) individually guided staff development, (3) involvement in a development or improvement program, and (4) inquiry. While there are exceptions, most of the programs included in this guide rely heavily on the training model, often conducted during the summer in the form of institutes. In most cases, the training was conducted by an external expert who was the program developer, and these developers typically were university faculty members.

Training is an efficient way to develop knowledge and skills. It offers opportunities for collaboration among peers and for establishing support networks. When training includes modeling or demonstrations, low risk practice, and coaching or other forms of ongoing support, it can be extremely effective as a means to acquire knowledge and skills (Joyce & Showers, 1995).

Besides training, observation (in the form of demonstrations and classroom observations and coaching) was the next most prevalent model of staff development. Most staff development programs integrated training with some form of observation. For example, the staff development program associated with Peoria Urban Mathematics Plan (PUMP) included a series of summer institutes. This was followed by ongoing classroom support: some demonstration lessons, observations of teachers, and feedback or coaching sessions to help teachers refine their content knowledge and instructional practices.

Some programs included involvement in a development or improvement process. Expeditionary Learning Outward Bound, because of the comprehensive nature of the program, offered numerous opportunities for teachers to design learning experiences for students and to establish school structures to support student success. These opportunities were arranged locally, regionally, and nationally and occurred in addition to numerous opportunities for teachers to extend their content knowledge and instructional strategies.

Mathematics Renaissance, Introducing Teachers to Inquiry, and Science Partnerships for Articulation and Networking (SPAN) are examples of programs that provide training *and* other models of staff development. These models included involvement in a development or improvement process, inquiry or action research, individually guided staff development, and observation and assessment. In Mathematics Renaissance and SPAN, teachers were engaged in collaborative work that extended beyond their individual classrooms and focused on making deep changes in the entire school organization to benefit students.

Training Outside the School Day

Most staff development occurred outside teachers' normal working day or year. For example, summer institutes offered extensive blocks of time for teachers to engage in meaningful learning experiences. In some cases, teachers received a small stipend for attending the institute or were given free tuition, room and board, and materials. During the school year, teachers often met after school and occasionally on weekends to extend their learning.

Only in a few programs were learning experiences integrated into the teachers' normal work day. Science Partnerships for Articulation and Networking (SPAN), Mathematics Renaissance, and Rice University School Mathematics Program (RUSMP) are some of the programs that have extensive staff development and support throughout the school day and year.

The National Staff Development Council recommends that 25 percent of the educators' work time be devoted to learning and collaborating with colleagues. This form of job-embedded staff development guarantees that all emplyees have the necessary knowledge and skills to fulfill their responsibilities and meet students' learning needs.

Support and Coaching

Follow-up for the programs included in *What Works in the Middle: Results-Based Staff Development* varies widely. Many programs built in periodic refreshers or meetings throughout the subsequent school year. Iowa Chautauqua, for example, built in two opportunities for teachers to meet, once in the fall and again in the spring to extend their learning and solve problems. Others, such as Student Team Literature, Peoria Urban Mathematics Program (PUMP) and Rice University School Mathematics Program (RUSMP), had regularly scheduled observations and feedback for teachers. Reading Power in the Content Areas held a follow-up meeting six to eight months after the initial training. Still others, such as Foundational Approaches in Science Teaching (FAST) and Project Legal, routinely provided follow-up outside of the classroom in the form of electronic and telephone support.

For some programs follow-up was at the discretion of the school or districts. Individual schools could select a format for follow-up. While a number of options existed for follow-up for most programs, the degree to which these opportunities were tapped is unclear.

The range of follow-up support can best be described by Figure 1. On one end of the continuum are non-classroom-based processes for follow-up and at the other

end are those processes that are classroom-based. Samples of follow-up processes for each end of the continuum and several that fall in between are identified. Those follow-up processes that are closer to the classroom help teachers at the point of delivery, where they are most likely to need support in order to change their instructional practices.

Figure 1: Types of Follow-up Support

Non-classroom Follow-up Support		Classroom-based Follow-up Support
• e-mail • phone • web site • listserv • electronic bulletin board • newsletters	• refresher meetings • conferences • advanced training	• demonstrations • co-teaching • observation with feedback • planning sessions • curriculum/lesson/unit development • problem-solving sessions • examining student work • action research

Access to Experts

The development of teacher leaders in some projects, such as Introducing Math Teachers to Inquiry, the National Writing Project, Powerful Connections, and Science Partnerships for Articulation and Networking (SPAN), provided teachers easy access to local expertise at their individual schools or in their districts. Local experts are often master teachers who volunteer to assume a leadership role. They provide immediate assistance to teachers as they implement new content and instructional strategies into their classrooms. This easy access to local support increases the likelihood that teachers will seek and receive assistance in a timely manner when they have problems. Access to support also helps to sustain teachers' efforts and motivates them to continue implementing new practices, rather than falling back on more familiar or more comfortable processes.

In some cases, access to experts occurred through electronic means. The advent of e-mail, Web sites, listservs, and bulletin boards places help only a click away. Project Legal, Foundational Approaches in Science and Technology (FAST), and several other

projects provide electronic support to teachers via phone, fax, e-mail, electronic newsletters, and so on. These electronic means of providing support offer teachers the flexibility to access the support on their own terms. Via electronic media, they are not dependent on others' schedules and can tap into these resources whenever it is convenient for them.

Time for Implementation and Refinement

Staff development programs that offer teachers time to redesign their curriculum and instructional units help teachers better prepare to implement their learnings in the classroom. A number of projects, such as Introducing Math Teachers to Inquiry, Peoria Urban Mathematics Program (PUMP), Reading in the Content Areas, and Iowa Chautauqua provide time throughout the staff development program for teachers to develop instructional materials that they can use immediately with their students.

Since redesigning curriculum and instruction is a time-consuming and complex task, teachers benefit from time set aside to work collaboratively with their colleagues to engage in this work. When several teachers plan together, they gain from the perspectives, experiences, knowledge, and skills of one another.

In addition to time during the training, teachers also need time back at school to plan and redesign their existing practices and processes. This type of planning and redesign is needed throughout the school year in larger blocks of time than typical daily planning time permits. When teachers have the opportunity to work cooperatively with their peers, they become engaged in a powerful form of staff development that allows them to grapple with "real" issues related to the new content and instructional processes.

Support Materials

Programs that provide teachers with sample units, lessons, or other instructional materials help scaffold implementation of the new strategies and content. For example, Student Team Literature and Project Success Enrichment provide resource materials for teachers to use in the early stages of implementation while they are becoming familiar with the new instructional processes. These materials make the transition phase easier for teachers as they are learning to modify comfortable processes and change their instructional practices. When materials are readily available, teachers can concentrate more on their instruction and not worry as much about developing the necessary tools to teach the new content or implement the new instructional practices.

Research-Based Staff Development

The state of staff development in the content areas leaves room for improvement. Staff development of the past was often disconnected to student learning needs, fragmented, formatted in one-shot workshops or presentations, external to the work day, and funded with limited resources. Schlechty (1997) says, "For too long, the professional development of teachers has been a third-rate undertaking conducted under conditions that are not only uninspiring, but sometimes humiliating" (p. 252). Programs included in this resource guide are breaking with tradition and beginning to offer sustained, challenging, in-depth learning experiences for teachers.

Staff development, designed to produce results in terms of student learning, is based on student learning needs; is supported with resources and time; and is embedded in the school day and year. It includes extensive opportunities for teachers to learn from and with each other in collaborative endeavors within a community of learners. It focuses on extending teachers' content knowledge and content-specific instructional skills. And it incorporates multiple models of learning with extensive classroom-based support. Several programs in this resource guide exemplify quality staff development.

Alignment with NSDC Standards

The National Staff Development Council established standards in 1994 for middle-level staff development (see pages 182-183). Drawing from research and best practices, these standards were validated by professional organizations, researchers, and practitioners. Each program included in *What Works in the Middle: Results-Based Staff Development* was assessed in light of these 27 standards.

Table 6 (page 184) identifies the NSDC standards that each program meets. Because individual districts or schools were not studied, the presence of context standards was the most difficult to determine. Context standards describe the characteristics of the school or district necessary to support implementation. These are the essential systemic elements that increase the likelihood that a program will succeed. Some program developers consciously addressed these standards in the design of their programs; other did not. When program developers design staff development using all the NSDC standards as guidelines — including the context standards — the resulting program is more systemic in nature. In addition, it is more likely to result in increased student and teacher learning and in greater organizational improvement.

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Schlechty, P. (1997). *Inventing Better Schools: An Action Plan for Educational Reform.* San Francisco: Jossey-Bass.

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National Staff Development Council
Standards for Staff Development: Middle Level Edition

Effective middle-level staff development:

Context

1. requires and fosters the norm of continuous improvement.

2. requires strong leadership in order to obtain continuing support and to motivate all staff, school board members, parents, and the community to be advocates for continuous improvement.

3. is aligned with the school's and the district's strategic plan and is funded by a line item in the budget.

4. provides adequate time during the work day for staff members to learn and work together to accomplish the school's mission and goals.

5. is an innovation in itself that requires study of the change process.

Process

6. provides knowledge, skills, and attitudes regarding organization development and systems thinking.

7. is based on knowledge about human learning and development and models this understanding in all activities.

8. provides for the three phases of the change process: initiation, implementation, and institutionalization.

9. bases priorities on a careful analysis of disaggregated student data regarding goals for student learning.

10. uses content that has proven value in increasing student learning and development.

11. provides a framework for integrating innovations and relating those innovations to the mission of the organization.

12. requires an evaluation process that is ongoing, includes multiple sources of information, and focuses on all levels of the organization.

13. uses a variety of models of staff development approaches to accomplish the goals of improving instruction and student success.

14. provides follow-up necessary to ensure improvement.

15. requires staff members to learn and apply collaborative skills to conduct meetings, make shared decisions, solve problems, and work collegially.

16. requires knowledge and use of the stages of group development to build effective, productive, collegial teams.

Content

17. increases administrators' and teachers' understanding of how to provide school environments and instruction that are responsive to the developmental needs of adolescents.

18. facilitates the development and implementation of school and classroom-based management plans that provide staff with school-wide and classroom-based management strategies that maximize student learning.

19. increases administrators' and teachers' ability to provide guidance and advisement to adolescents.

20. addresses diversity by providing awareness and training related to the knowledge, skills, and behaviors needed to ensure that an equitable and quality education is provided to all students.

21. increases educators' ability to provide challenging, developmentally-appropriate curriculum based on desired skill and knowledge outcomes for all students.

22. increases staff's knowledge and practice on interdisciplinary team organization and instruction.

23. prepares educators to combine academic student learning goals with service to the community;

24. prepares teachers to use research-based teaching strategies appropriate to their instructional objectives and their students.

25. prepares educators to demonstrate high expectations for student learning;

26. helps teachers and administrators engage parents and families in improving their children's educational performance.

27. prepares teachers to use various types of performance assessment in their classrooms

Table 6: National Staff Development Council's Standards for Staff Development: Middle Level

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Language Arts																											
unior Great Books					x		x			x			x	x	x		x	x		x	x			x	x		x
tudent Team Literature	x				x		x		x	x	x	x	x	x	x		x	x		x	x			x	x		x
xemplary Center for Reading Instruction					x		x		x	x			x	x			x	x		x	x			x	x		x
ational Writing Project	x	x			x		x		x	x		x	x	x	x	x	x	x		x	x			x	x		x
rofile Approach to Writing					x		x		x	x			x	x			x			x	x	x		x	x		x
roject Success Enrichment					x		x			x			x	x			x			x	x	x		x	x		x
ix Trait + 1 Writing Assessment					x		x		x	x			x	x			x	x		x	x			x	x		x
Mathematics																											
awaii Algebra Learning Project					x		x		x	x		x	x	x			x	x		x	x			x	x		x
troducing Math Teachers to Inquiry	x				x		x		x	x		x	x	x	x	x	x	x		x	x			x	x		x
lathematics Renaissance	x	x		x	x	x	x		x	x	x	x	x	x	x		x	x		x	x			x	x		x
eoria Urban Mathematics Plan	x	x	x	x	x		x		x	x		x	x	x	x		x	x		x	x			x	x		x
owerful Connections	x		x		x		x	x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x		x
ice University School Mathematics Project				x	x		x		x	x	x	x	x	x	x	x	x	x		x	x			x	x		x
niv. of Illinois at Chicago—All Learn Mathematics	x	x		x			x		x	x		x	x	x	x		x	x		x	x			x	x	x	x
Science																											
arthStorm		x			x		x			x		x	x	x	x		x	x		x	x		x	x	x	x	x
oundational Approaches to Science Teaching					x		x			x		x	x	x			x				x			x	x		x
wa Chautauqua Program		x			x		x			x		x	x	x	x	x	x			x	x	x	x	x	x		x
cience Partnerships for Articulation and Networking	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x			x	x		x
tudent Watershed Research Project		x					x			x			x	x	x		x				x		x	x	x		x
Social Studies																											
oject LEGAL					x		x			x			x	x			x	x			x			x			x
e the People ... The Citizen and the Constitution					x		x			x			x	x			x	x		x	x			x	x		
e the People ... Project Citizen					x		x			x			x	x			x	x		x	x			x	x		
Interdisciplinary																											
Expeditionary Learning Outward Bound	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Fernwood Project		x					x					x	x	x	x		x		x	x	x		x			x	
Project CRISS					x	x	x			x			x	x			x	x			x	x		x	x		x
Reading Power in the Content Areas					x		x		x	x		x	x	x			x	x		x	x	x		x	x		x

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How to Use This Guide

Enormous amounts of money are spent on staff development each year. These funds come from local school district budgets, private and public foundations, federal and state budgets, and educators' personal funds. To date, many school policy decision-makers remain unconvinced that staff development provides a significant return on the investment, either in terms of changes in teacher practice or in student achievement. *What Works in the Middle: Results-Based Staff Development* hopes to change this in two ways:

1. Those who have responsibility for selecting staff development initiatives will benefit from examples of staff development programs that have evidence of increasing student achievement. The programs included in this volume have been carefully reviewed to ensure they meet established criteria. These model programs can be adopted, adapted, or used as models for the development of local initiatives. Each of these programs provides (1) evidence of how it has improved student achievement, (2) a well-designed staff development component, and (3) evidence showing that the program can be duplicated elsewhere. Of course, programs that replicate these examples will most likely be successful if implemented with a high degree of fidelity to the original design.

2. For staff development leaders and program developers, the selected programs will serve as models of ways to demonstrate the impact of staff development. Many providers want evidence of how their programs benefit teachers and students. The assessment processes employed by evaluators of these programs serve as model evaluation designs, which other program developers can replicate or adapt.

Before referring to the programs featured in this guide, school teams have a number of preliminary tasks to complete. The steps and questions in this chapter will guide some of the decisions school teams will need to make before selecting a staff development approach. These steps, in essence, are the steps to school improvement. Schools that have developed a thoughtful plan for improvement will have completed these steps as a part of their routine school improvement work. School teams should become "knowledgeable choosers." "Educational leaders who understand the

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strengths, weaknesses, and goals of their school and school district will be able to evaluate how various programs will match these to produce the best results in terms of student learning" (pg. 20, Educational Research Service, 1998).

Step 1. Review student achievement data.

To produce results, staff development must be directly tied to student achievement needs. Before selecting or designing staff development, a careful and thorough analysis of student achievement data must occur. This analysis will help identify specific student achievement strengths and areas of need and will guide decisions about staff development programs.

Key questions to answer during this step include:

- What are available assessments?
- What is being measured with this assessment?
- Which students were involved in the assessment?
- What areas of student performance are at or above expectations?
- What areas of student performance are below expectations?
- Do patterns exist in the data?
- How did various sub-populations of students perform? (consider factors such as gender, race, socio-economic status)
- What are other data telling us about student performance in this area?
- How are the data similar or different in various grade levels, content areas, and individual classes?
- What surprises us?
- What confirms what we already know?

The data analysis process should result in knowing or identifying:

- Specific areas of deficit;
- Specific knowledge and skills students need in order to overcome the deficit; and

- Specific students or groups of students for whom the deficit is most prevalent or pronounced.

For example, assume a school's scores on a norm-referenced test are below the expected or desired level in reading. These scores are insufficient by themselves to use for planning a staff development intervention. Now assume that the school staff analyzes sub-test scores and sub-population scores. The staff finds a deficit in vocabulary for Hispanic students. This information *can* be used to guide the selection and/or design of a staff development intervention to address the need to improve vocabulary among Hispanic students.

The latter information is actionable — that is, it is specific enough to identify what teachers need to know and be able to do in order to improve student performance in reading vocabulary. To simply identify reading as the area of focus provides insufficient information to guide the design and/or selection of a staff development program.

Step 2. Identify the unique characteristics of the school, community, staff, and/or district.

School decision-makers need to know how best to meet the needs of their students. When school leaders and teachers understand the unique characteristics of the students, they can use this information to make appropriate instructional and program decisions.

Understanding the conditions under which the staff development program will be implemented also helps inform the selection and/or design of a staff development initiative. For example, a staff development program for experienced teachers may be different than one for novice teachers. Likewise, a staff development program designed to enable staff to meet the needs of urban, disadvantaged students may be different than one for rural schools. Additionally, a program provided in a district or school setting with limited resources or time for staff development will need to be different than one in a district or school that has set aside time and resources for staff development.

Therefore, schools should complete a school profile that gives them information about their own environment and conditions to help them make informed decisions.

Key questions to answer in this area are:

- What are the characteristics of our students?
  Some characteristics to consider are:
  - Ethnicity
  - Gender
  - Socio-economic status

- Mobility
- Family support
- Motivation
- Attitude about school
- Experience in school
- Academic performance
- Retention rate
- Parents' education level
- Sibling data

- What are the characteristics of the staff?
  Some characteristics to consider are:
  - Years of experience
  - Years at a grade level
  - Years in the school
  - Past experience with staff development
  - Motivation
  - Performance/ability
  - Attitude
  - Sense of efficacy
  - Response to change
  - Collegiality
  - Extent to which degrees match teaching assignments
  - Level of education

- What are some characteristics of our formal and informal leadership for both teachers and administrators?
  Some characteristics to consider are:
  - Leadership style
  - Roles of formal and informal leaders
  - Level of participation in leadership activities
  - Opportunities to be involved in leadership roles/activities
  - Trust in leadership
  - Support by leadership
  - Support for leadership
  - Level of communication

- What are some characteristics of our community?
  Some characteristics to consider are:
  - Support for education
  - Support for the school
  - Involvement in school activities
  - Support for students
  - Support for staff development

- What resources are available to support this improvement effort?

  Some considerations are:
  - Budget
  - Time
  - Support personnel in the building
  - Support personnel outside the building
  - Union contract
  - Incentives

Step 3. Establish clear, measurable outcomes for the staff development program.

Schools must understand what they hope to accomplish in terms of both student and teacher learning as a result of their staff development efforts. Without a clear goal and specific target, it is easy to miss the mark. Key questions are: (1) What results do you seek for students? (2) What results do you expect for staff? (3) How do school practices, procedures, and policies affect these goals?

Expected results should first be stated in terms of student achievement and then in terms of changes in teacher practices and characteristics. In other words, expected outcomes are stated in terms that allow the school to know if it has or has not achieved the intended results. Too often, results are stated in terms of process rather than achievement.

For example, a goal that states that "One hundred percent of the staff will participate in training in brain-based learning" does not say what will happen for students as a result of this training. A preferable goal is one that states that "In three years, 90 percent of students will read on grade level as a result of teachers learning and imple-

menting new instructional strategies." The latter goal is focused on the end result of the staff development, rather than what occurs in the process.

Step 4. Study the staff development programs described in the guide.

Before determining how to accomplish the goal, school teams need to examine proven staff development programs, those that have evidence of their impact on student learning. Too often this important step is overlooked. In their urgency to improve student performance, school staffs adopt programs with which they are unfamiliar, or they design one of their own. School staffs often fail to conduct a critical review of what is available and what has proven successful. The programs in this guide are a starting point for this review.

In examining programs, consider the following questions:

- Which programs address the skills and knowledge we have identified as our needs?
- What programs are being used in schools with similar demographics?
- If our school's characteristics do not match those of schools in which the program was successfully implemented, what are the key differences? How likely are those differences to interfere with the program's success?
- What changes could be implemented to increase the likelihood of our success?
- What aspects of the program (if any) might need to be modified to accommodate the unique features of our school?
- What are the strengths and weaknesses of the program?
- What school, district, and community support was required to make the program successful?

Step 5. Before selecting a program, answer these questions:

- How will we assess the initiation, implementation, and institutionalization of the program?
- How will we support the program?

- How will we support the individuals involved?
- What are we equipped to do in-house to support and implement the program, and what outside resources will we need?
- What resources are we dedicating to the program?
- What is our timeline for full implementation?
- What benchmarks along the way will help us know if we are being successful?
- Are we willing to commit time, energy, and financial resources to this effort for the long term?
- How will we align this new initiative with existing ones? What may need to be eliminated to make resources available for this program?
- How closely do the goals of this program align with our school's improvement goals and the district's strategic goals?

The worksheet on pages 192 and 193 is a tool for reviewing staff development programs. Once completed, the worksheet becomes a handy reference guide to each program being considered. As schools are studying various staff development options, the worksheet offers a framework for collecting information about each option and for comparing programs prior to making decisions about which option to select and implement. The areas of the worksheet correspond to the criteria used to select programs for inclusion in *What Works in the Middle: Results-Based Staff Development*.

With a completed worksheet for each program under consideration, staff development committee leaders will find it easier to compare programs and select the best program to address the needs of their school or district. After this initial study is completed, school and district staff members will be better equipped to make informed decisions about appropriate staff development interventions to address their student achievement needs.

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Staff Development Program Review

Program Title
Content Area(s)
Grade(s)

Contact Name _____
Address _____
_____
Phone _____
Fax _____
E-mail _____
Website _____

Program Goals

Evidence of Success	Yes	No	Measure	Notes
Student Achievement				
Student Behaviors				
Student Attitudes				
Teacher Content Knowledge				
Teacher Behaviors/Practices				
Teacher Attitudes				

Program Content	Notes
Content	
Pedagogy	

Staff Development Processes					
Models of Staff Development	**Yes**	**No**	**Frequency**	**Length**	**Notes**
Individually Guided Staff Development					
Observation and Assessment					
Training					
Development or Improvement Process					
Inquiry or Action Research					

Follow-up	Yes	No	Notes
Classroom-based			
Non classroom-based			

Program Context			
Geographic	**Yes**	**No**	**Notes**
Rural			
Urban			
Suburban			
Other			

Student/School Demographics	**Notes**
Ethnic/Racial	
Socio-Economic Status	
Size of School/District	
Teaching Staff	

Support Needed	**Notes**
Community	
District	
Building	

Other Features	**Notes**

Intended Participants	**Yes**	**No**	**Notes**
Individual teachers			
Team			
Grade Level			
School			
District			

Cost	**Yes**	**No**	**Notes**
Honorarium			
Travel Costs (airfare, lodging, meals, etc.)			
Materials			
Other			

	Site Reference	**Site Reference**	**Notes**
School Name Address Phone Fax			

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Next Steps

What Works in the Middle: Results-Based Staff Development is another step in the journey of demonstrating the link between staff development and student achievement and ensuring teachers have access to quality staff development that advances their content knowledge and content-specific pedagogical processes. To take this work to the next stage requires the support of staff development leaders, both at the school- and district-level, and staff development providers, evaluators, and researchers. This last chapter outlines some of the next steps needed to move forward.

1. Provide content-rich, intellectually challenging staff development.

Teachers deserve quality staff development that relates to their subject area content and content-specific pedagogical processes. They are eager to delve deeply into content, understand it, and use that understanding to make decisions about how to teach local, state, and national standards. In selecting, designing, and delivering staff development, content must be given more prominence.

2. Create powerful learning experiences.

The learning processes used in staff development must challenge teachers' belief systems and knowledge constructs. Staff development must be structured to create cognitive dissonance in the learners, strengthen their efficacy and will to succeed, to challenge their understanding of the content area. It should help teachers understand how the content is best taught and how students learn in the discipline. Teachers have the right to expect for themselves what they provide their students: intellectually rigorous learning experiences.

3. Use appropriate models of staff development.

Many of the programs highlighted in *What Works in the Middle: Results-Based Staff Development* use training as the core model of professional development. In developing staff development plans, school and district planners should incorporate other models of job-embedded staff development. Too often, training is equated with staff development. In reality, other models of staff development that are more closely related to the real work of teachers may promote higher levels of learning for both teachers and students. These models include coaching, action research, examining student work, collaborative planning and development, study groups, and others.

4. Provide long-term follow-up support.

Changes in teachers' understanding of their subject area and in their instructional practices require ongoing, long-term classroom-based support. Frequently, staff development is followed by inadequate support. Classroom-based support systems that include coaching, collaborative planning, examining student work, co-teaching, and other forms of personalized follow-up need to focus equally on teacher knowledge, practice, and student work.

5. Gather evidence to demonstrate the impact of staff development on student achievement.

Both providers and coordinators of staff development must clearly state their expectations and hold themselves accountable for achieving the intended results. They must gather and share evidence of the impact that staff development has on student achievement. Past evaluations of staff development have too often focused on qualities of the design of the staff development experience and what participants have learned, rather than the ultimate result: how well *student* learning improves. Measuring student achievement results is complex; yet, despite these challenges, this type of evidence of the impact of staff development must be collected.

6. Explore new evaluation methods to link staff development and student achievement.

Researchers and school and district leaders need to collaborate to identify the best methods to link staff development and student achievement. Current evaluation methods require considerable time and cost and are impractical for most schools and districts to use. The combined efforts of researchers and practitioners should yield other, more practical, ways of demonstrating the link between staff development and student achievement.

7. Become savvy consumers of staff development programs.

Staff development leaders need to ask more questions and demand more information prior to selecting teacher enhancement programs. Rather than selecting staff development programs solely on the quality of their design, they should select programs based primarily on their alignment with local needs and on the quality of their results with students. *What Works in the Middle: Results-Based Staff Development* provides guidelines to help schools and districts select staff development programs that have evidence of their impact on student achievement.

8. Create organizational structures to support ongoing teacher learning.

The link between teacher learning and student learning is clearer now as a result of *What Works in the Middle: Results-Based Staff Development* and the initiative from which it evolved. Staff development is necessary, but by itself cannot effectively increase student learning. Higher levels of teacher learning occur in collaborative, supportive school structures that value continuous improvement and that allocate time and resources to teacher learning.

9. Create systems and structures to sustain programs once they are in place.

Schools and districts often expend a tremendous amount of energy designing and developing staff development initiatives. As a result, little effort remains to guarantee in-depth implementation. Staff development leaders need to balance effort, resources, and attention to both the initiation and implementation phases if the initiative is to be successfully integrated into the educational system. Particular attention must be given to sustaining the focus on the initiative by reducing competitive programs; continuing the training and development for newly hired teachers; providing tiered assistance; aligning other systems such as the compensation, supervisory, and recognition systems to support the initiative; providing frequent formative assessment; and using the assessment data to make adjustments.

10. Use *What Works in the Middle: Results-Based Staff Development* to advance the conversations.

This resource guide is provided as a tool for a variety of purposes and must be used appropriately. It provides model staff development programs that have evidence of their impact on student learning. It offers models of how to evaluate the impact of staff development. It offers examples of current staff development programs. It will surely spark conversation about a number of issues related to linking staff development and student achievement. Staff development leaders should use this resource guide to stimulate more conversation and continue the search for answers to the critical questions posed in the guide.

Measure of Our Success

Further study and analysis of the relationship between staff development and student achievement are necessary. If *What Works in the Middle: Results-Based Staff Development* generates more dialogue about the link between staff development and

student achievement, it is successful. If schools gain ideas about how to evaluate their staff development and student achievement efforts, it will have made a contribution. If experts in research, evaluation, and measurement join in the search to identify and design new evaluation tools and methods that schools and districts can use to demonstrate the link between staff development and student achievement, all schools will gain tools for continuous improvement. And, if the quality of staff development increases and students achieve at higher levels, the intended results will be realized.

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